



Service Manual

# Service Manual

## KG271/KG276



Model : KG271/KG276



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# 1. INTRODUCTION

## 1.1 Purpose

This manual provides the information necessary to repair, description and download the features of this model.

## 1.2 Regulatory Information

### A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common-carrier telecommunication service of facilities accessed through or connected to it.

The manufacturer will not be responsible for any charges that result from such unauthorized use.

### B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

### C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the this phone or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

### D. Maintenance Limitations

Maintenance limitations on this model must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs except as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

# 1. INTRODUCTION

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## E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

## F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

## G. Interference and Attenuation

Phone may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

## H. Electrostatic Sensitive Devices

### ATTENTION

**Boards, which contain Electrostatic Sensitive Device (ESD), are indicated  by the sign. Following information is ESD handling:**

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

## 2. PERFORMANCE

### 2.1 H/W Features

Item	Specifications
Band	GSM DUAL Band(900/1800)
Type	Bar type
Dimension	98 * 45 * 12.9mm
Weight	60g
Battery	750mAh Li-ion
Talk Time	Over 2hours @EGSM,TX Level : 5
Stand-by Time	Over 200 hours @Paging period : 5
RTC	Under 4 hours when removed battery.
Antenna	Internal Type(Dual-band)
LCD(Main)	1.52"(128x128 pixels), 65K Color STN LCD
Back Light	Yes
Back Light color	Blue
Vibrator	Yes
Speaker&Receiver	Yes(11x07 Receiver, 16®™ Speaker)
C-MIC	Yes
Earphone Jack	Mono or Stereo(Optional)
SIM	Yes(Plug in Type) : 3.0V
MIDI	16 poly
I/O Connect	18 Pins (included Earphone Jack)

## 2. PERFORMANCE

### 2.2 S/W Features

Function	Detail Item		Specification	Etc.
Operating System	OS	O	OSE	
Data	Circuit	O		
	Packet	X		
Connectivity	Infrared (IrDA)	X		
	Bluetooth	X		
	USB	X		
	USB Mass storage	X		
	RS232	O		
Voice Function	Voice Recording	X		
	Voice Command	X		
	Answering machine	X		
Memory	User Memory	O	TBD	Under 300KB
		X	MMS	
		X	Pictures (Still Image & Moving Image)	
		X	MP3 (Music Contents)	
		X	Java Contents	
		O	Wallpaper	3 bitmap images
		O	Ringtone	10 MIDI Ringtones
		X	external memory (microSD)	
Camera	Camera Module	X		
Audio	Voice Codec	O	FR, HR, EFR, AMR-NB	
	AMR	O		
	FM Radio	O		
	Integrated handsfree speaker	O	Speaker phone mode	

## 2. PERFORMANCE

Function	Detail Item		Specification	Etc.
Display	RSSI	O	6 level	
	Battery Level	O	5 level	
	RTC	O		
	Multi?Language	O	Basic:English Max. 4 language of Latin 2 or 3 language of etc.	
	Quick Access Mode	X		
	PLMN/Service Indicator	O		
	Dimming Clock	X		
	Dual Clock	X	Local Time / Selected Area Time	
Normal Features	Last Dialed Number	O	10	
	Last Received Number	O	10	
	Last Missed Number	O	10	
	Scratch Pad Memory	X		
Call Manage-ment	Call Waiting	O		
	Call Swap	O		
	Call Retrieve	O		
	Auto Answer	X		
	Automatic Redial	O		
	Calling Line dentification	O		
	Full Call divert	O		
	Speed Dialing	O		
	Last Number Redial	O		
	Multi-party Call (Conference Call)	O		
	Explicit Call Transfer	X		



## 2. PERFORMANCE

Function	Detail Item		Specification	Etc.
Network	Automatic Network Selection	O		
	Manual Network Selection	O		
	Network Service Status	O		
DTMF	DTMF Signaling	O		
	DTMF Enable & Disable	O		
Audio	Key Tone Volume	O	6 Level (Include Mute)	
	Ring Tone Volume	O	6 Level (Include Mute)	
	Ring Tone Pattern	O	10Type(fixed)	
	Ring Type Silent	O	Vibrator & Ring (Indicator)	
	Earpiece Volume	O	6 Level (Include Mute)	
	Mute	O		
Cell Broadcast	Read Cell Broadcast	O		
	Cell Broadcast Categories	O		
	Cell Broadcast Message Language	O		
Phone Book	Entry	O	300	
	Field	O	Office, Mobile	
	Numeric Store and Recall	O		
	Alphabetic Store	O		
	Alphabetic Recall	O		
	Scroll by alphabetic or numeric order	O		
	Last Number Dialed	O	10	
	Last Number Missed	O	10	
	Last Number Received	O	10	
	Copy & Move	O		
	Fixed Dial Number	O		
	Barred Dial Number	X		
	Service Dial Number	O		
	Email Entry	X		
	Picture ID	X		
	Video Caller ID	X		
	My Name card	X		

## 2. PERFORMANCE

Function	Detail Item		Specification	Etc.
Supp. Services	Call Forwarding	O	All Incoming Calls,	
		O	No Reply	
		O	On Busy,	
		O	Not reachable	
	Call Barring	O	All Outgoing Calls,	
		O	International Calls,	
		O	Calls except to Home Country incoming Calls,	
		O	All incoming Calls when roaming	
	Conference Call	O	up to 3 calls	
SIM	Plug?In Type	O	3 V only	
	SIM Lock	O	Service Provider / Network Lock	
	SIM Toolkit	O	Class 1, 2, 3	
	Prepaid SIM Operation	O		
	Mega SIM	X		
Short Messaging Manage-ment	Read Message	O		Not Support EMS
	Write and Edit Message	O		
	Send and Receive Message	O		
	Reply to Message	O		
	Forward Message			
	Extract Number from Message	O		
	Message Status	O		
	Message Unread Indicator	O		
	Settable Message Center Number,	O		
	Reply Path and Validity	O		
	Visible and Audible Message Receive Alerting	O		
	Voice Mail	O		
	Settable Voice Mail Center Number	O		
	Message Protocol	O	Normal, Fax, National Paging, Email, X400, ERMES, Voice	
	Message Overflow Indicator	O		
	Message Center Number	O		
	Help Menu	X		

## 2. PERFORMANCE

Function	Detail Item		Specification	Etc.
Sound contents	Ringtones	O		
	Karaoke	X		
	Stutter Sound	X		
	Flip tone	X		
	Button tone	O		
	Others	X		
Miscellaneous Function	Development & Test Facility	O		
	Field Test Facility	O		
	Display Software Version	O		
	IMEI	O		
Text Input	Language	O	Selectable Auto Language	
	Predictive word input	O	T9	
Scheduler	Schedule	O	20 input (20 character)	
	To Do List	X	50 input	
	Memo	O	20 input (40 character)	
	D-day counter	X		
	Send via Bluetooth	X	Schedule, Memo, To Do list, Messaging	
World Time	Setting Local Time	O		
	Display Two Number of Cities Time	X	Dual clock	
	Daylight saving	X	Summer time calibration function	
	NITS	X	Automatic setting as country code in SIM	
Unit converter		O	Currency, Surface, Length, Weight, Temperature, Volume, Velocity	
Stop watch		O		
Calculator	Calculation	O	+ - * /	
PC Sync	Phone Book Sync	X		
	Message Sync	X		
	Multimedia Contents Sync	X		
	Scheduler Sync	X	E-MAIL, EMS, Schedule, Phonebook, Name card etc.	
Sync ML	DS	X		
	DM	X		
Game		X		
Menu	Quick Access Mode (Profile)	X		
External Interface	Electrical Man Machine Interface	O		
	Development and Test Facility	O		

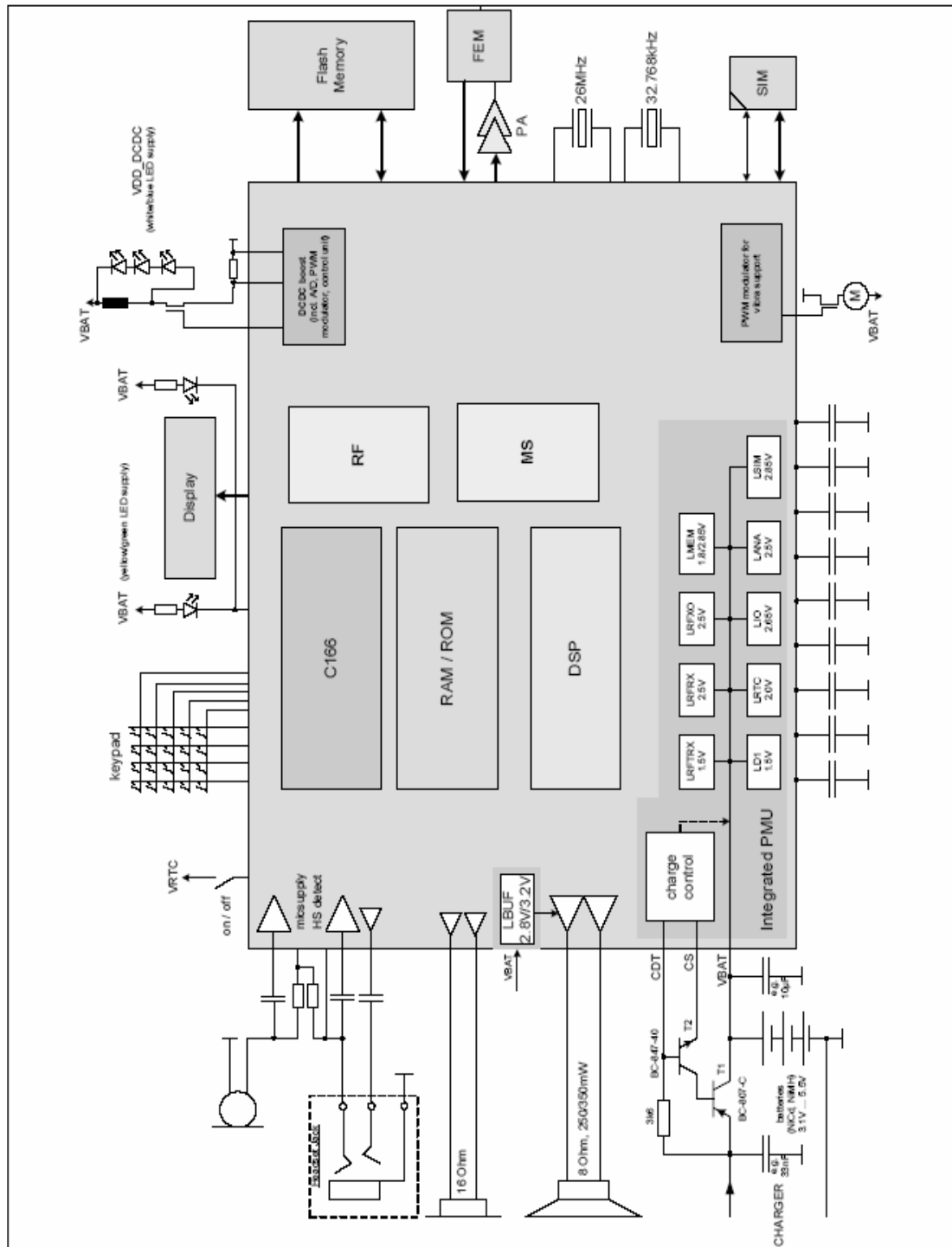
## 2. PERFORMANCE

Function	Detail Item		Specification	Etc.
Handset	Restore Factory Setting	O		
	Read Software Version	O		
	Battery Charging Mode	O		
Security	Emergency Call	O		
	Handset Lock	O		
	Security Code	O	Delete all	
	SIM Lock	O		
	Key guard	O		
Real Time Clock	12/24 hour	O		
	Calendar	O	Automatic Leap Year Adjustment	
	Time Zone	O		
	Daylight saving	X		
	Alarm Manager	O	Once, Daily, Mon~Fri, Mon~Sat	
	Dimming Clock	X		
	Power-off Alarm	O		
	On Alarm Event	O	Display	
	Hand strap	X		
	Embedded microSD Card	X		
Accessory	microSD Adapter	X		
	Stereo earmic	O	EarMic Type	Provides optionally only for supporting FM radio function.
	earmic w/music remote controller	X		
	Neck strap	X		
	LCD Cleaner	X		
	Holster	X		
	Data cable	O	RS232 cable	Option
	CD	X		
	Holster charger	X	Standard battery Back-up and Holster function	
	additional standard battery	X		
	Extended Battery	X		
	Desktop Charger	X		
	Cigar Lighter Adapter	X		
	Portable Handsfree	X		
	Bluetooth headset	X		
	Bluetooth stereo earset controller	X		
	Car kit	X		
	Leather Pouch	X		
	Stylus Pen	X		
		X		
	Compass	X		

### 3. TECHNICAL BRIEF

## 3. TECHNICAL BRIEF

### 3.1 Digital Main Processor(PMB7880)



**Figure. 3-1 PMB7880 FUNCTIONAL BLOCK DIAGRAM**

### 3.1.1 Overview of E-GOLDvoice

The E-GOLDvoice is a GSM baseband modem including RF transceiver covering the low bands GSM850 /GSM900 and high bands GSM1800 / GSM1900 bands.

E-GOLDvoice is Dual Band, therefore, it supports by default a low / high pair of bands at the same time:

1. GSM850 / GSM1800
2. GSM850 / GSM1900
3. GSM900 / GSM1800
4. GSM900 / GSM1900

The E-GOLDvoice is optimized for voice-centric Mobile Phone applications.

The E-GOLDvoice is designed as a single chip solution that integrates the digital, mixed-signal, RF functionality and a direct-to-battery Power Management Unit.

The transceiver consists of:

- Constant gain direct conversion receiver with an analog I/Q baseband interface
- Fully integrated Sigma/Delta-synthesizer capability
- Fully integrated two-band RF oscillator
- Two-band digital GMSK modulator with digital TX interface
- Digitally controlled crystal oscillator generating system clocks.

The E-GOLDvoice supports a direct battery connection, hence eliminating the need for an external Power Management Unit. The E-GOLDvoice has different power down modes and an integrated power up sequencer.

The E-GOLDvoice is powered by the C166®S MCU and TEAKLite® DSP cores. The operating temperature range from -40C to 85C. It is manufactured using the 0.13 μm CMOS process.

## 3. TECHNICAL BRIEF

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### 3.1.2 Features

- ▶ Baseband
  - High performance fixed-point TEAKlite DSP
  - C166S high performance microcontroller
  - There are several Interfaces:
    - I2S interface for DAI connections (for Tape Approval)
    - High Speed SSC Interface for connection of external peripherals
    - SIM Interface
    - Keypad Interface (6x4 or 5x5 keys)
    - EBU for external RAM/FLASH connection
    - Asynchronous serial interface
    - JTAG Interface
    - Black & white and color displays are supported
    - PWM source to drive vibrator
    - Keypad and display backlight supported.
- ▶ Receiver
  - Constant gain, direct conversion receiver with fully integrated blocking filter
  - Two integrated LNAs
  - No need of interstage and IF filter
  - Highly linear RF quadrature demodulator
  - Programmable DC output level
  - Very low power budget.
- ▶ Transmitter
  - Digital Sigma-Delta modulator for GMSK modulation, typical -163.5 dBc/Hz@20 MHz
  - Single ended outputs to PA, Pout = +3.5 dBm
  - Very low power budget.
- ▶ RF-Synthesizer
  - $\Sigma\Delta$  Synthesizer for multi-slot operation
  - Fast lock-in times ( $< 150 \cdot \mu\text{s}$ )
  - Integrated loop filter
  - RF Oscillator
  - Fully integrated RF VCO.
- ▶ Crystal Oscillator
  - Fully digital controlled crystal oscillator core with a highly linear tuning characteristic.

- ▶ Mixed Signal and Power Management Unit
  - DC/DC boost for voltages up to 15V for driving White or Blue LEDs
  - 8-Ohm loud speaker driver (250/350mW)
  - 16-Ohm earpiece driver
  - 32-Ohm headset driver
  - 4 measurement interfaces (PA temperature, battery voltage, battery temperature, and ambient temperature)
  - Differential microphone input
  - System start up circuitry
  - Charger circuitry for NiCd, NiMh and Lilon cells
  - Integrated regulators for direct connection to battery.



## 3. TECHNICAL BRIEF

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### 3.1.3 GSM System Description

The E-GOLDvoice is suited for mobile stations operating in the GSM850/900/1800/1900 bands.

In the receiver path the antenna input signal is converted to the baseband, filtered, and then amplified to target level by the RF transceiver chipset.

Two A-to-D converters generate two 6.5 Mbit/s data streams. The decimation and narrowband channel filtering is done by a digital baseband filter in each path.

The DSP performs:

1. The GMSK equalization of the received baseband signal (SAIC support available)
2. Viterbi channel decoding supported by an hardware accelerator.

The recovered digital speech data is fed into the speech decoder.

The E-GOLDvoice supports fullrate, halfrate, enhanced fullrate and adaptive multirate speech CODEC algorithms.

The generated voice signal passes through a digital voiceband filter. The resulting 4 Mbit/s data stream is D-to-A converted by a multi-bit-oversampling converter, postfiltered, and then amplified by a programmable gain stage.

The output buffer can drive a handset ear-piece or an external audio amplifier, an additional output driver for external loud speaker is implemented.

In the transmit direction the differential microphone signal is fed into a programmable gain amplifier.

The prefiltered and A-to-D converted voice signal forms a 2 Mbit/s data stream. The oversampled voice signal passes a digital decimation filter.

The E-GOLDvoice performs speech and channel encoding (including voice activity detection (VAD) and discontinuous transmission (DTX)) and digital GMSK modulation.

In the RF transceiver part, the baseband signal modulates the RF carrier at the desired frequency in the 850 MHz, 900 MHz, 1.8 GHz, and 1.9 GHz bands using an I/Q modulator. The E-GOLDvoice supports dual band applications.

Finally, an RF power module amplifies the RF transmit signal at the required power level. Using software, the E-GOLDvoice controls the gain of the power amplifier by predefined ramping curves (16 words, 11 bits).

For baseband operation, the E-GOLDvoice supports:

- Making or receiving a voice call
- Sending or receiving an SMS.

### 3.1.4 PMU Details

The E-GOLDvoice includes battery charger support (various sensor connections for temperature, battery technology, voltage, etc.) and a ringer buffer.

E-GOLDvoice avoids the need for an external power management component because its internal power management unit contains:

- Voltage regulators for the On-chip and Off-chip functional blocks
- Charger circuitry for NiCd, NiMh and Lilon cells.

### 3.1.5 Bus Concept

The E-GOLDvoice has two cores (a microcontroller and a DSP), each with its own bus.

There is an interconnection between the TEAKlite bus and the C166S X-Bus.

### 3.1.6 C166S Buses

The C166S is connected to three buses:

1. Local Memory (LM) bus
2. X-Bus
3. PD-Bus.

### 3.1.7 TEAKLite Bus

The TEAKlite is connected to the TEAKlite bus.

### 3.1.8 Bus Interconnections

The interconnection between the X-Bus and the TEAKlite Bus uses:

- Multicore Synchronization
- Shared Memory.

### 3.1.9 Clock Concept

The E-GOLDvoice has a flexible clock control.

### 3.1.10 Interrupt Concept

The C166 MCU carries out the E-GOLDvoice interrupt system.

### 3.1.11 Debug Concept

The E-GOLDvoice includes a multi-core debug. The C166 and TEAKlite cores can be debugged in parallel with:

- A single JTAG port (that is, on a single host)
- Mutual breakpoint control.

## 3. TECHNICAL BRIEF

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### 3.1.12 C166 Debug Concept

The debugging of the C166 uses the OCDS and the Cerberus.

### 3.1.13 TEAKLite Debug Concept

TEAKlite debugging uses the OCEM and the SEIB.

### 3.1.14 Power Management

The E-GOLDvoice provides the power management unit (PMU) for the complete mobile phone application. The integrated PMU is directly connected to the battery and provides a set of linear voltage regulators (LDO's).

These LDO's generate all required supply voltages and currents needed in a low feature mobile phone. A charger control circuit charges NiCd, NiMH and Lilon batteries.

The charger control supports hardware controlled pre-charging and software controlled charging. It offers a wide charger voltage range, making halfwave/full-wave charging with cheap transformers possible.

White/blue backlight generation is supported with a special driver for very a low external parts count.

Power consumption during operation phases is minimized due to flexible clock switching. In the Standby Mode most parts of the device are switched off, only a small part is running at 32kHz and the controller RAM is switched to a power saving mode. The TEAKLite ROM can be switched off during Standby via SW.

### 3.1.15 On-Chip Security Concept

Secure boot is based on a public/private key approach. Flash images that are not signed with the private key during phone manufacture cannot be loaded.

Verification of the Flash code is done with the public key. The public key as well as hash and verify algorithms are stored in the ROM, which ensures a hardware secured boot procedure.

The following security features are supported:

- Prevention of illegal Flash programming
- Flash programming makes use of the E-GOLDvoice ID for personalization checks with IMEI and SIM-lock protection

The security features use the following mechanism:

- Boot ROM flow:
  - Controls the boot transition to external flash
  - Controls the flash update
- Flash tied to the individual chip via an ID using e-fuses, that is, each E-GOLDvoice chip has its own fused ID.

Further details on the E-GOLDvoice security concept are not publicly documented.

### 3.1.16 Asynchronous Operation Mode Concept

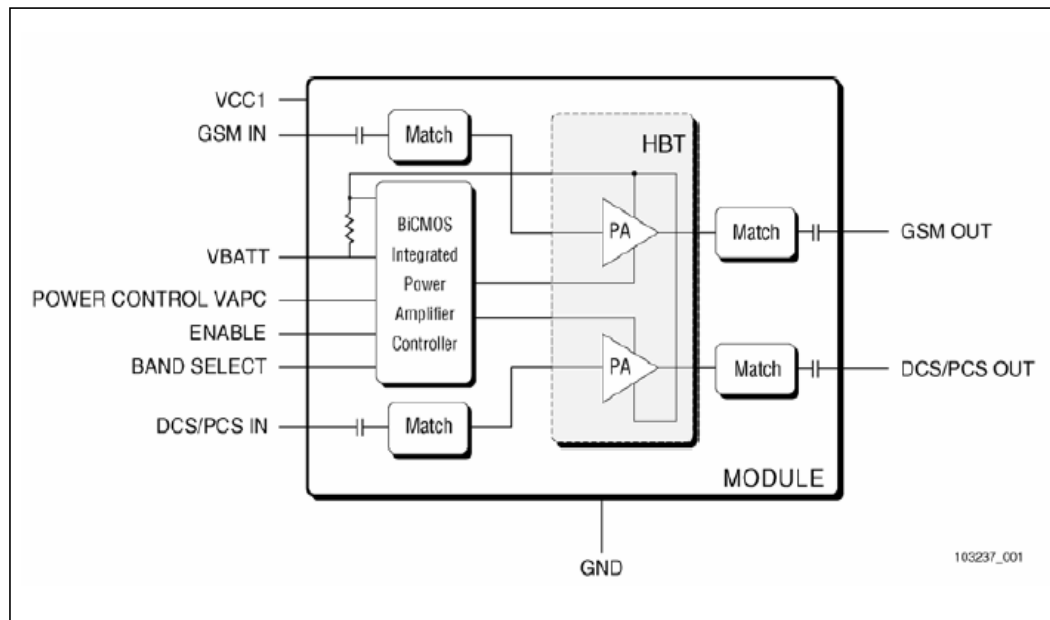
The E-GOLDvoice can operate in either:

- The traditional synchronous mode with the 26MHz system clock synchronized on the base station
- A special asynchronous mode (XO concept).

In the asynchronous mode the 26MHz clock input is not synchronized with the base station; the residual frequency offset is compensated in the digital signal processing domain. This processing includes frequency and timing compensation of the baseband and voiceband signals.

### 3. TECHNICAL BRIEF

#### 3.2 Power Amplifier Module (SKY77318)



**Figure. 3-2 SKY77318 FUNCTIONAL BLOCK DIAGRAM**

The SKY77318 Power Amplifier Module (PAM) is designed in a low profile (1.2 mm), compact form factor for quad-band cellular handsets comprising GSM850/900, DCS1800, and PCS1900 operation. The PAM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation.

The module consists of separate GSM PA and DCS1800/PCS1900 PA blocks, impedance-matching circuitry for 50  $\Omega$  input and output impedances and a Power Amplifier Control (PAC) block with an internal current-sense resistor. The custom BiCMOS integrated circuit provides the internal PAC function and interface circuitry.

Fabricated onto a single Gallium Arsenide (GaAs) die, one Heterojunction Bipolar Transistor (HBT) PA block supports the GSM bands and the other supports the DCS1800 and PCS1900 bands. Both PA blocks share common power supply pins to distribute current.

The GaAs die, the Silicon (Si) die, and the passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic overmold.

### 3. TECHNICAL BRIEF

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RF input and output ports of the SKY77318 are internally matched to a 50  $\Omega$  load to reduce the number of external components for a quad-band design. Extremely low leakage current (2.5  $\mu$ A, typical) of the dual PA module maximizes handset standby time. The SKY77318 also contains bandselect switching circuitry to select GSM (logic 0) or DCS/PCS (logic 1) as determined from the Band Select (BS) signal.

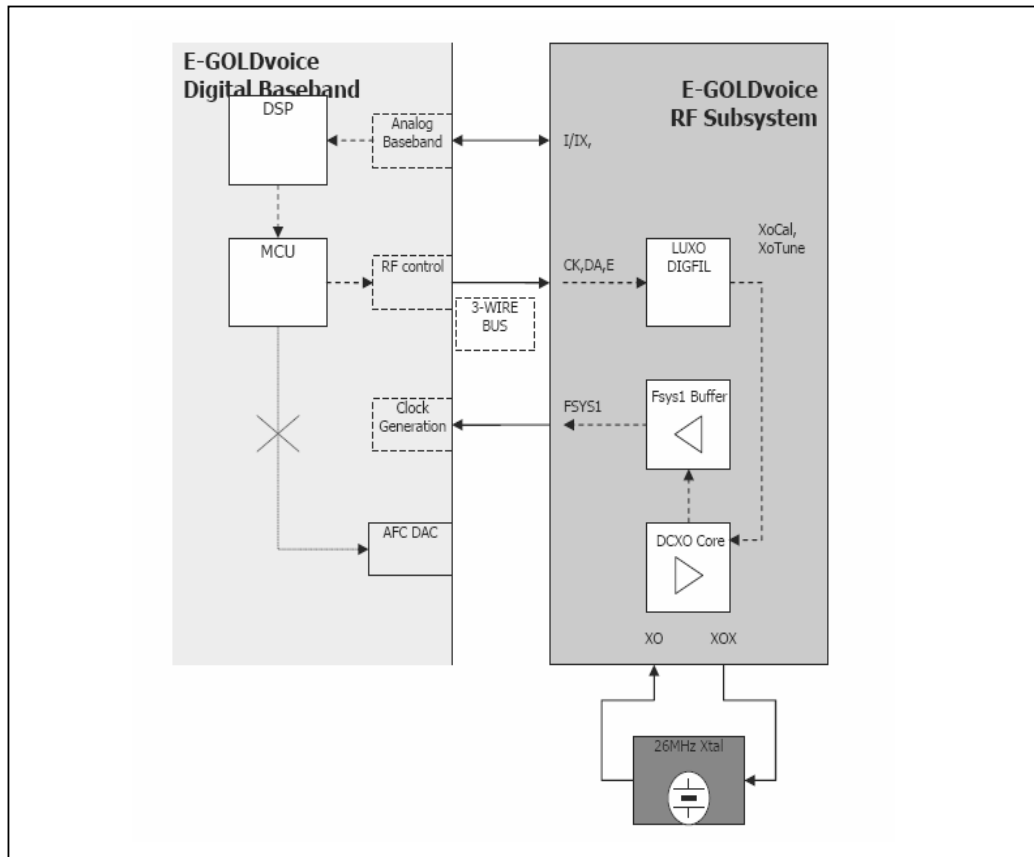
In Figure 1 below, the BS pin selects the PA output (DCS/PCS\_OUT or GSM\_OUT) and the Analog Power Control (VAPC) controls the level of output power.

The VBATT pin connects to an internal current-sense resistor and interfaces to an integrated power amplifier control (iPAC™) function, which is insensitive to variations in temperature, power supply, process, and input power.

The ENABLE input allows initial turn-on of PAM circuitry to minimize battery drain.

### 3. TECHNICAL BRIEF

#### 3.3 26 MHz Clock (DCXO)



**Figure. 3-3 E-GoldVoice DCXO Overview**

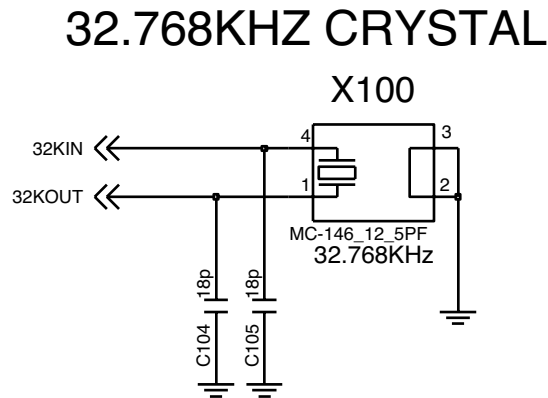
DCXO (Digitally Controlled Crystal Oscillator) and VCTCXO (Voltage Controlled Temperature Compensated Crystal Oscillator) are two different techniques used To maintain the mobile's reference oscillator's accuracy over time. The reference oscillator's accuracy over time will vary due to initial crystal frequency offset, temperature drift and aging.

These static and dynamic frequency variations have to be compensated, otherwise the mobile would be in danger of losing connection to the network.

The technique used to perform the frequency compensation is generally termed Automatic Frequency Control (AFC).

To summarize the operation of DCXO, GSM Baseband processor will calculate the AFC compensation (which is continuously updated) required based on the measured frequency error. Then the required AFC compensation is sent to the LUXO (Linearization Unit of Crystal Oscillator), which in turns control the DCXO core and generates The 26MHz system clock.

#### 3.4 RTC(32.768KHz Crystal)



**Figure. 3-4 E-Gold Voice RTC Interface**

The integrated Real Time Clock (RTC) is able to provide programmable alarm functions and external interrupts. Due to its extreme low power consumption the RTC can be supplied from a small backup battery. This allows the generation of external interrupts, even when the main PMB7880 supply voltage is switched off. For this purpose the RTC is powered by own voltage supply pins VDD\_RTC and VSS\_RTC.

The RTC shall be driven by a 32.768 kHz (32k) clock which needs to be applied via the PMB7880 F32K and OSC32K pins. The clock can be fed from either an external clock source or use the on chip 32 KHz oscillator module.

The low clock frequency and the optimized low power design give the possibility to run the chip with a minimum of power dissipation. For example, for this specific application the 26 MHz reference oscillator can be switched off during system standby and a lowpower time reference can be kept when the 32k clock is provided to the RTC.

The RTC consists of an PMB7880 specific RTC shell, containing the RTC macro, as well as the 32 kHz oscillator, as described in the following sections. The module RTC Shell solely performs level translation of the 32KHz clock to the VDD\_LD1 power supply domain, and is not functionally associated with the RTC.



### 3. TECHNICAL BRIEF

#### 3.5 LCD Interface(3-wire SPI interface)

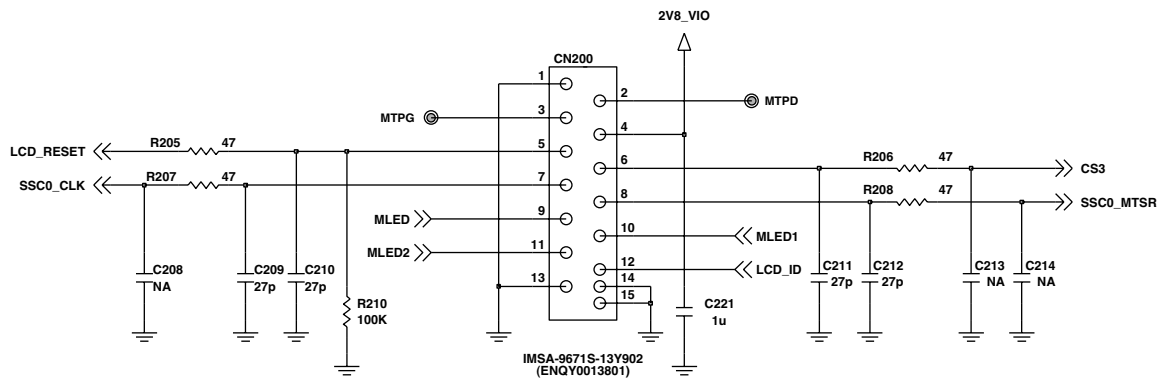


Figure 3-5-1. LCD Interface

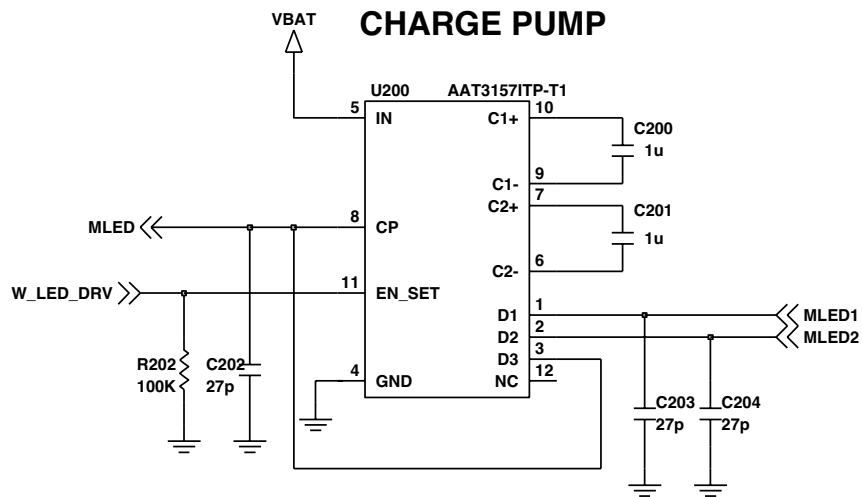


Figure 3-5-2. Charge pump interface

### 3. TECHNICAL BRIEF

Signals	Description
CS3	This signal enable to access to the driver IC of LCD.
SSC0_MTSR	This signal transfer serial data to driver IC.
SSC0_CLK	This signal transfer serial clock to driver IC.
LCD_RESET	This signal makes driver IC to HW default status.
MLED	This signal provide power to white LEDs.
MLED1/2	This signal be feed back from white LEDs.
2V8_VIO	This signal provides power to LCD modules.(2.8V)

The AAT3157 is a low noise, constant frequency charge pump DC/DC converter that uses a trimode load switch (1X), fractional (1.5X), and doubling (2X) conversion to maximize efficiency for white LED applications. The AAT3157 is capable of driving up to three channels of LEDs at 20mA per channel from a 2.7V to 5.5V input.

The current sinks may be operated individually or in parallel for driving higher current LEDs. A low external parts count (two 1 $\mu$ F flying capacitors and two small 1 $\mu$ F capacitors at VIN and VOUT) make this part ideally suited for small, battery-powered applications. AnalogicTech's S2Cwire™ (Simple Serial Control™) serial digital input is used to enable, disable, and set current for each LED with 16 settings down to 50 $\mu$ A.

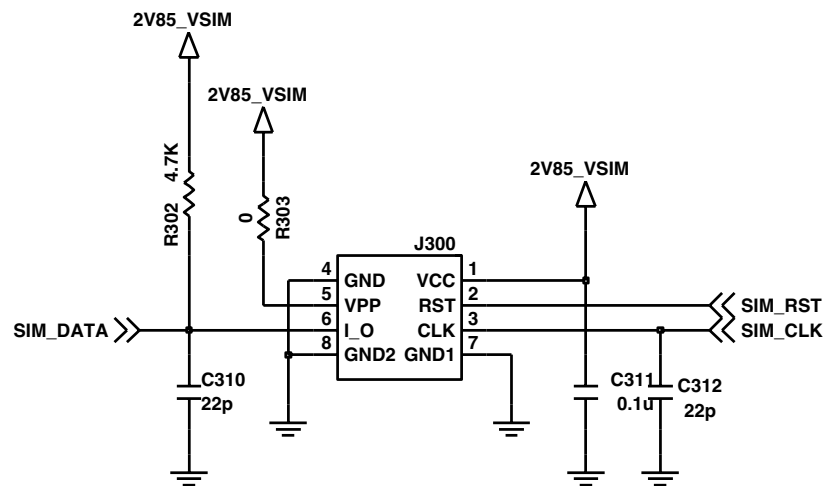
The low-current mode supply current can be as low as 50 $\mu$ A to save power.

Data	Output (mA/Ch)	Data	Output (mA/Ch)
1	20.0	9	5.0
2	17.0	10	4.2
3	14.0	11	3.4
4	12.0	12	2.8
5	10.0	13	1.0
6	8.6	14	0.5
7	7.0	15	0.1
8	6.0	16	0.05

**Figure 3-5-3. Charge pump Output Current**

### 3. TECHNICAL BRIEF

#### 3.6 SIM Card Interface

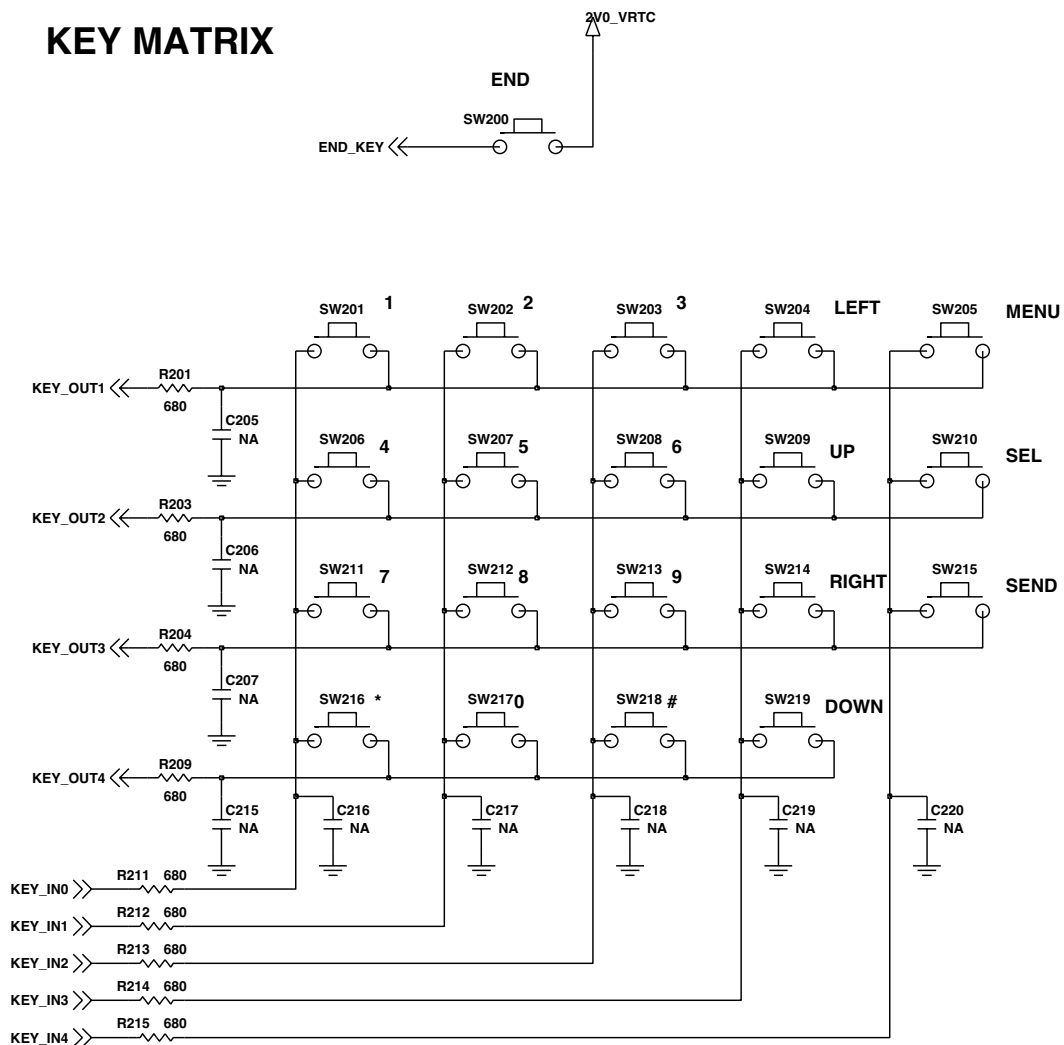


**Figure 3-6. SIM CARD Interface**

The EGoldVoice provides SIM Interface Module. The AD6527 checks status Periodically During established call mode whether SIM card is inserted or not, but it doesn't check during deep sleep mode. In order to communicate with SIM card, 3 signals SIM\_DATA, SIM\_CLK, SIM\_RST.

Signals	Description
SIM_RST	This signal makes SIM card to HW default status.
SIM_CLK	This signal is transferred to SIM card.
SIM_DATA	This signal is interface datum.

### 3.7 KEYPAD Interface



**Figure 3-7 KEY MAXTRIX Interface**

The keypad interface is connected to the X-Bus, together with the XBIU and the Shared Memory Register, using a single Bus Interface.

The keypad supports two scan modes:

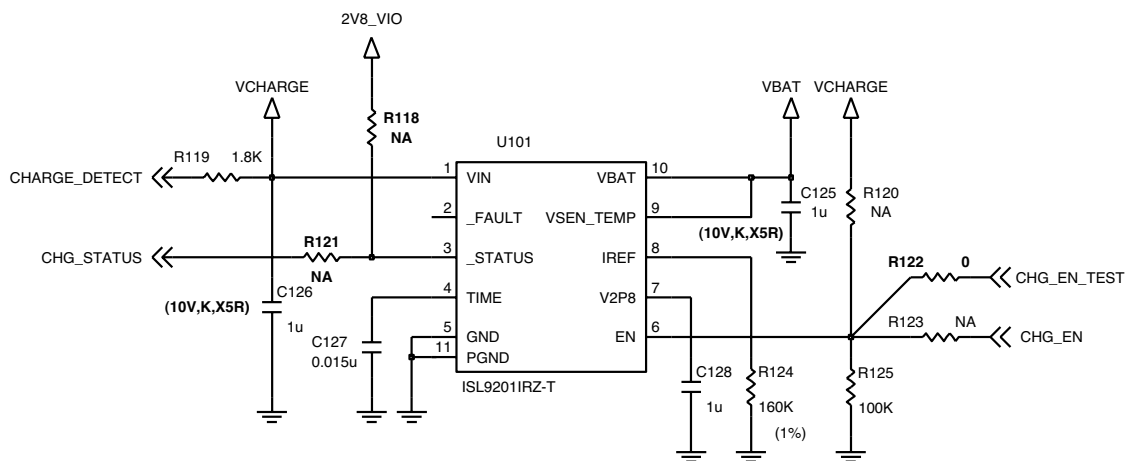
- By default, the keypad is a 4x6 scan matrix (4 input and 6 output pins).
- To set the keypad to a 5x5 scan matrix (5 input and 5 output pins)

The scan mode should be determined at the very beginning of the system start because changes are not allowed later.

### 3. TECHNICAL BRIEF

## 3.8 Battery Charging Block Interface

### CHARGING IC



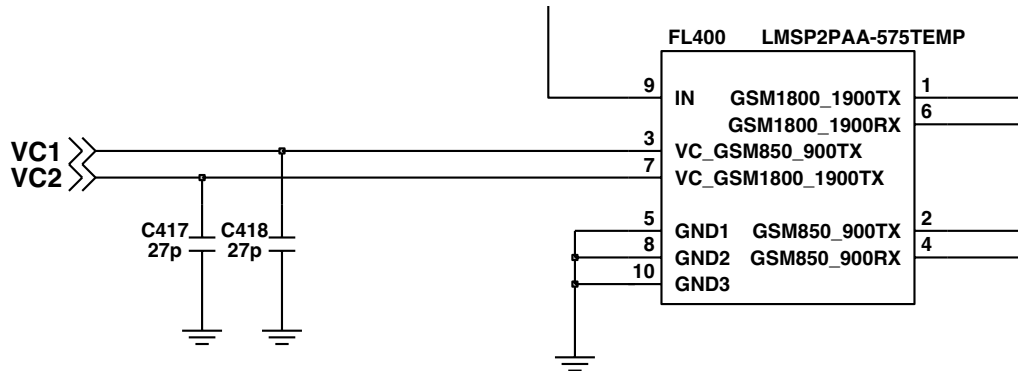
**Figure 3-8. Charging IC Interface**

The AAT3681A is a high performance battery charger designed to charge single Cell lithiumion/polymer batteries with up to 500mA of current from an external power source. It is a stand-alone charging solution, with just one external component required For complete functionality. The AAT3681A precisely regulates battery charge voltage and current for 4.2V lithium-ion/polymer battery cells.

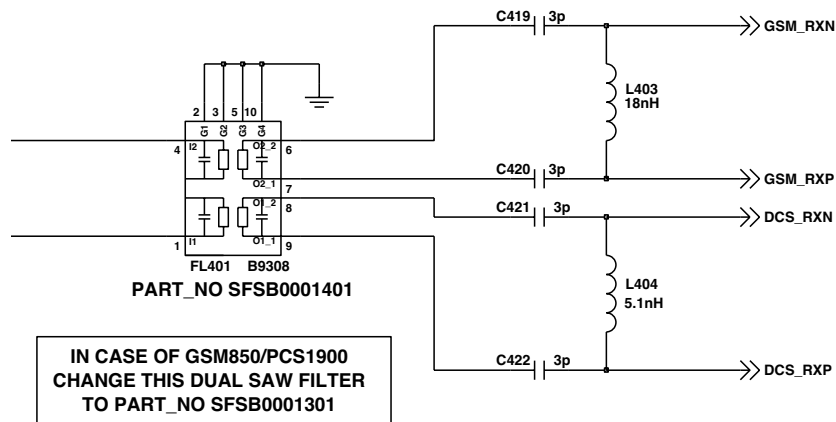
The adapter/USB charge input constant current level can be programmed up to 500mA for rapid charging applications.

The AAT3681A has four basic modes for the battery charge cycle: pre-conditioning/trickle charge; constant current/fast charge; constant voltage; and end of charge.

## 3.9 RF Interface



**Figure 3-9-1. ASM interface**

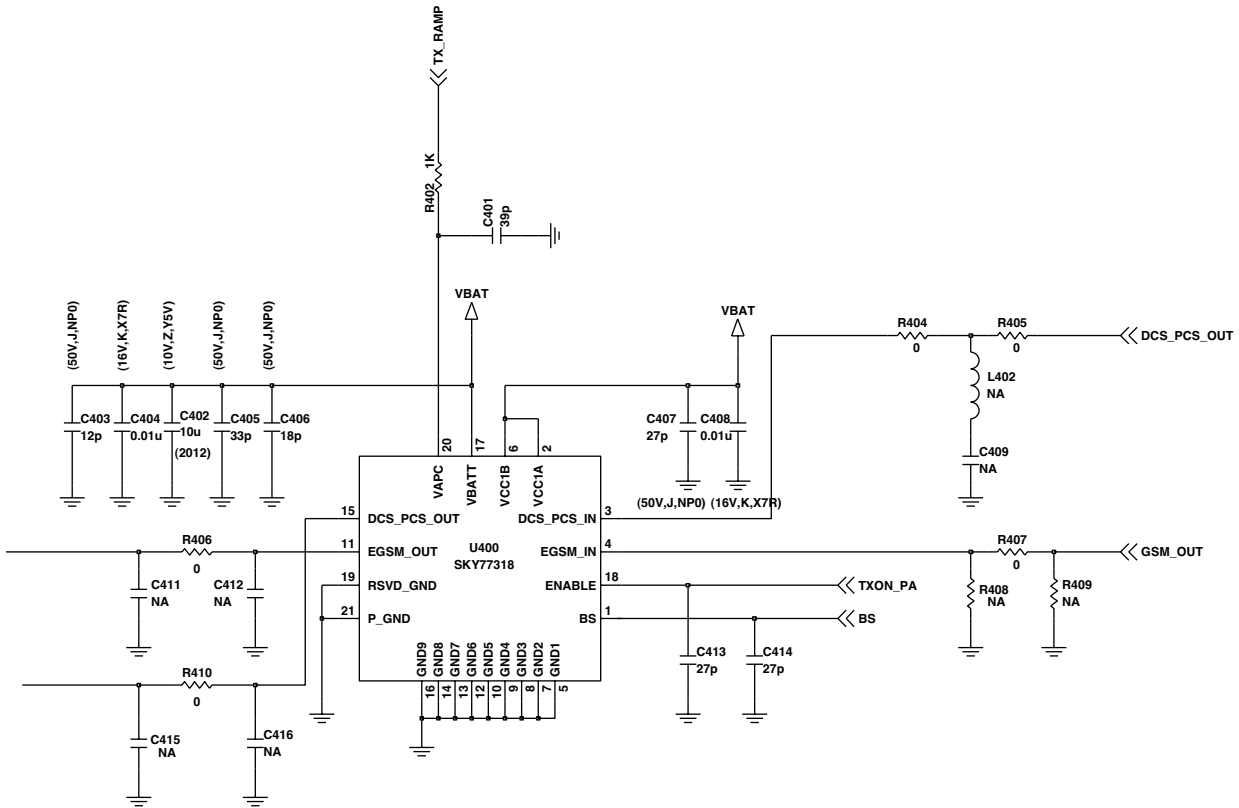


**Figure 3-9-2. SAW Filter interface**

E-GOLDvoice features a fully integrated constant-gain direct conversion receiver, i.e. there is no interstage filter needed and the baseband level at the analogue IQinterface follows directly the RF input level. Depending on the baseband ADC dynamic range, single- or multiple-step gain switching schemes are possible.

An integrated, selfaligning, low-pass filter ensures the receivers to function under blocking and reference interference conditions and avoids aliasing by baseband sampling. An automatic DC-offset compensation is implemented and can be switched depending on the gain setting.

### 3. TECHNICAL BRIEF



**Figure 3-9-3. PAM(Power Amplifier Module) interface**

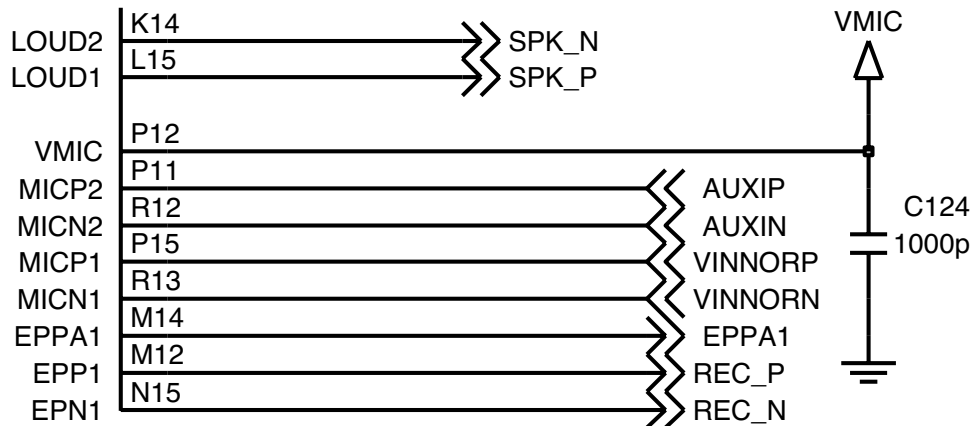
The digital transmitter architecture is based on a fractional-N sigma-delta synthesizer for constant envelope GMSK modulation. This configuration allows a very low power design with a reduced external component count.

The modulation is transferred between baseband- and RF-part of the PMB7880 via a digital interface signal into the digital modulator.

The following Gaussian filter shapes the digital data stream for the GMSK modulation. Additionally a pre-distortion filter compensates the attenuation of the PLL transfer function resulting in a very low distortion at the transmit output.

The filtered digital data stream is scaled appropriately and added to the channel word. This sum is fed into the MASH modulator. The output of the MASH modulator is a sequence of integer divider values representing the high resolution fractional input signal. This sequence controls the MMD (multi modulus divider) at a sample rate of 26MHz. Thus a tightly controlled frequency modulation of the VCO is achieved.

### 3.10 Audio Interface



**Figure 3-10-1 Audio interface**

The audio front-end of E-GOLDvoice offers the digital and analog circuit blocks for both receive and transmit audio operation and ringing. It features a high-quality, digital-to-analog path with amplifying stages for connecting acoustic transducers to the E-GOLDvoice. In the transmit direction the supply voltage generation for microphones, low-noise amplifier and analog to digital conversion are integrated on the E-GOLDvoice.

For E-GOLDvoice the EPP1/EPn1 driver are used as differential Earpiece-Driver, EPPa1 is used as single-ended Headset-Driver.

The audio front-end itself can be considered to be organized in three sub-blocks:

- Interface to processor cores (TEAKlite and - indirectly - C166S)
- Digital filters
- Analog part.



### 3. TECHNICAL BRIEF

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The interface to the processor cores consists of a direct physical connection to the TEAKlite DSP bus and a set of firmware commands to handle communication between the C166S and the audio front-end which serves as the interface peripheral for audio algorithms running on the DSP or the controller. The audio front-end Generates interrupts on certain occasions, for example, when exchange of data is requested. The core interface part of the audio front-end also contains the control and status registers which are used to set up certain operation modes of the peripheral.

The section next to the core interface contains the digital filters for interpolation and decimation of the audio signals being received and transmitted. The data path for the receive direction can be set up to process sampling rates between 8kHz and 48kHz.

The interpolation filters for the respective sampling rates are implemented in a dedicated hardware block and are automatically selected to suite the chosen sampling rate.

Low-pass interpolation filtering, which produces an unsigned 16-bit data stream with a sampling rate of 4 MHz, is performed digitally. D-to-A conversion, postfiltering, and final amplification are performed on the analog part. The amplifier buffer for voiceband receive does also support ringer functionality. The ringer functionality is activated by Setting bits RINGSELPN or RINGSELPA in the voiceband part of the analog control register.

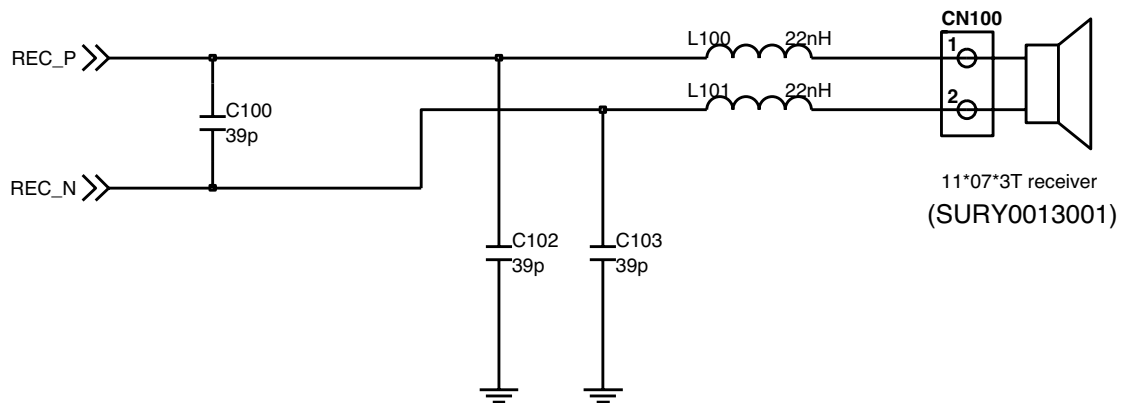
In transmit direction, amplification, prefiltering and A-to-D conversion (analog  $\Sigma \Delta$  modulation) are performed on the analog part. The resulting 2-Mbit/s data stream is filtered by a digital low-pass decimation filter for further processing by DSP firmware.

Two sampling rates, 8kHz and 16kHz, are supported.

The analog section contains all the necessary analog functional blocks including microphone supply generation, output and input amplifiers and analog filtering.

Signals	Description
EPp1	Main Receiver Positive signal(Differential signal)
EPn1	Main Receiver Negative signal(Differential signal)
EPpa1	Headset signal(Single Ended signal)
Loud1	Speaker Output Positive signal(Differential signal)
Loud2	Speaker Output Negative signal(Differential signal)
MICP1	Main Microphone Positive signal(Differential signal)
MICN1	Main Microphone Negative signal(Differential signal)
MICP2	Headset Microphone Positive signal(Differential signal)
MICN2	Headset Microphone Negative signal(Differential signal)
VMIC	Main/Headset Microphone supply power

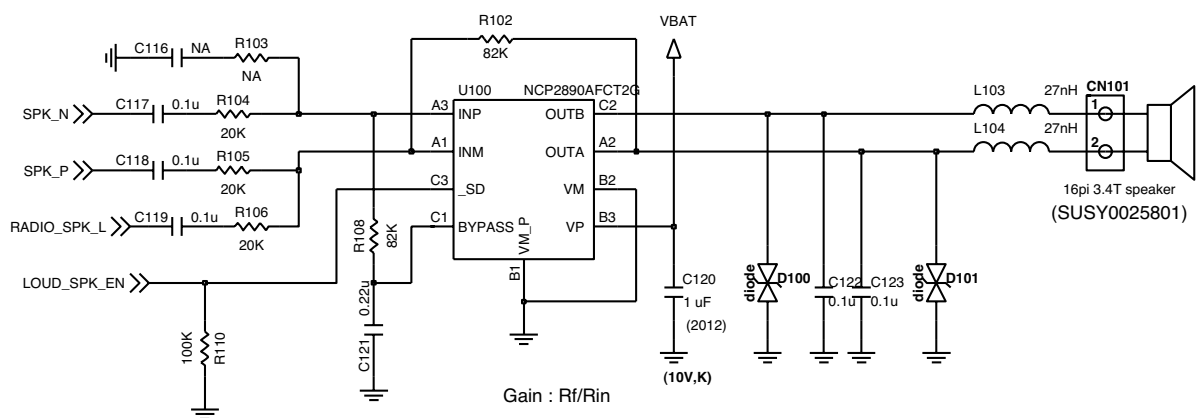
## RECEIVER



**Figure 3-10-2 Main Receiver interface**

## SPEAKER AMPLIFIER

## SPEAKER



**Figure 3-10-3 Main Speaker interface**

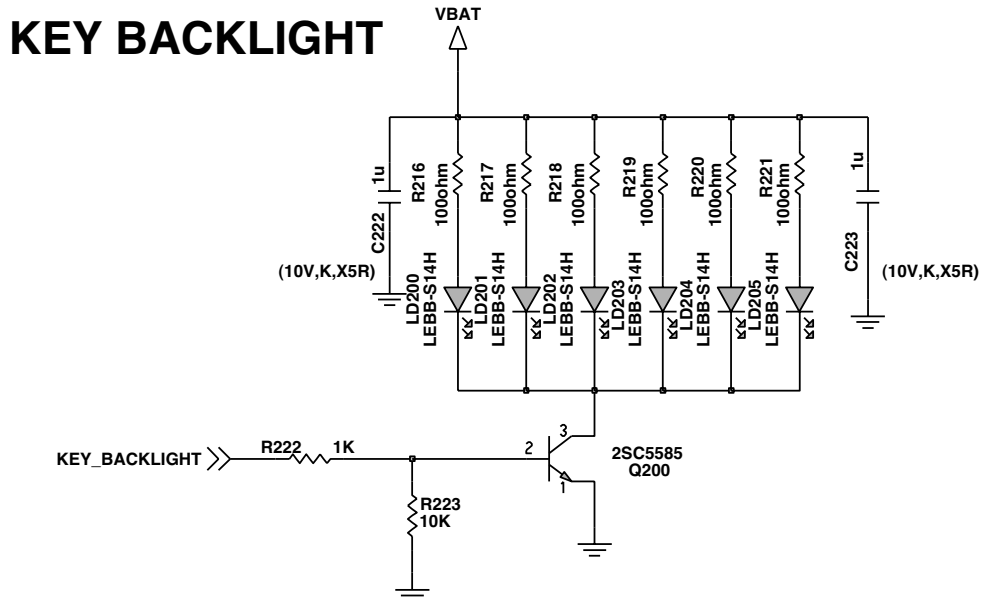


**Figure 3-10-4 Main Microphone interface**



### **Figure 3-10-5 Headset interface**

### 3.11 Key LED Interface



**Figure 3-11 Key LED interface**

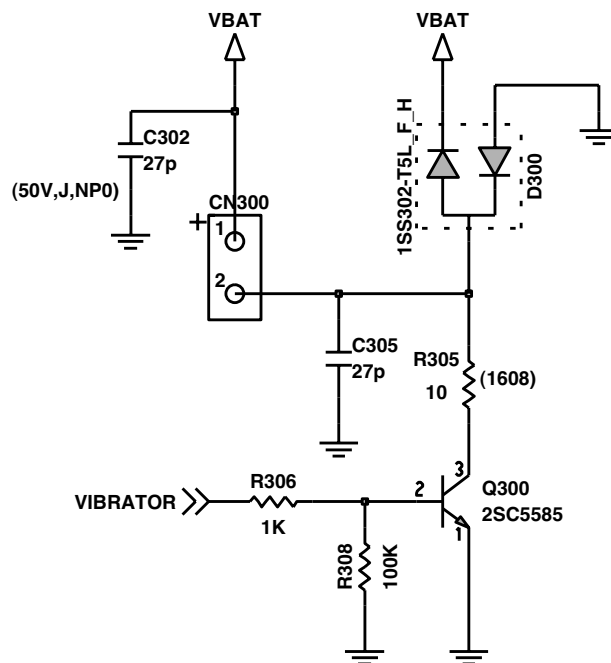
This handset has 6 LEDs that illuminates blue color.

Control signal is controlled by EGold-voice with PWM and handset has 3 methods, ON, OFF and Dimming.

### 3. TECHNICAL BRIEF

#### 3.12 Vibrator Interface

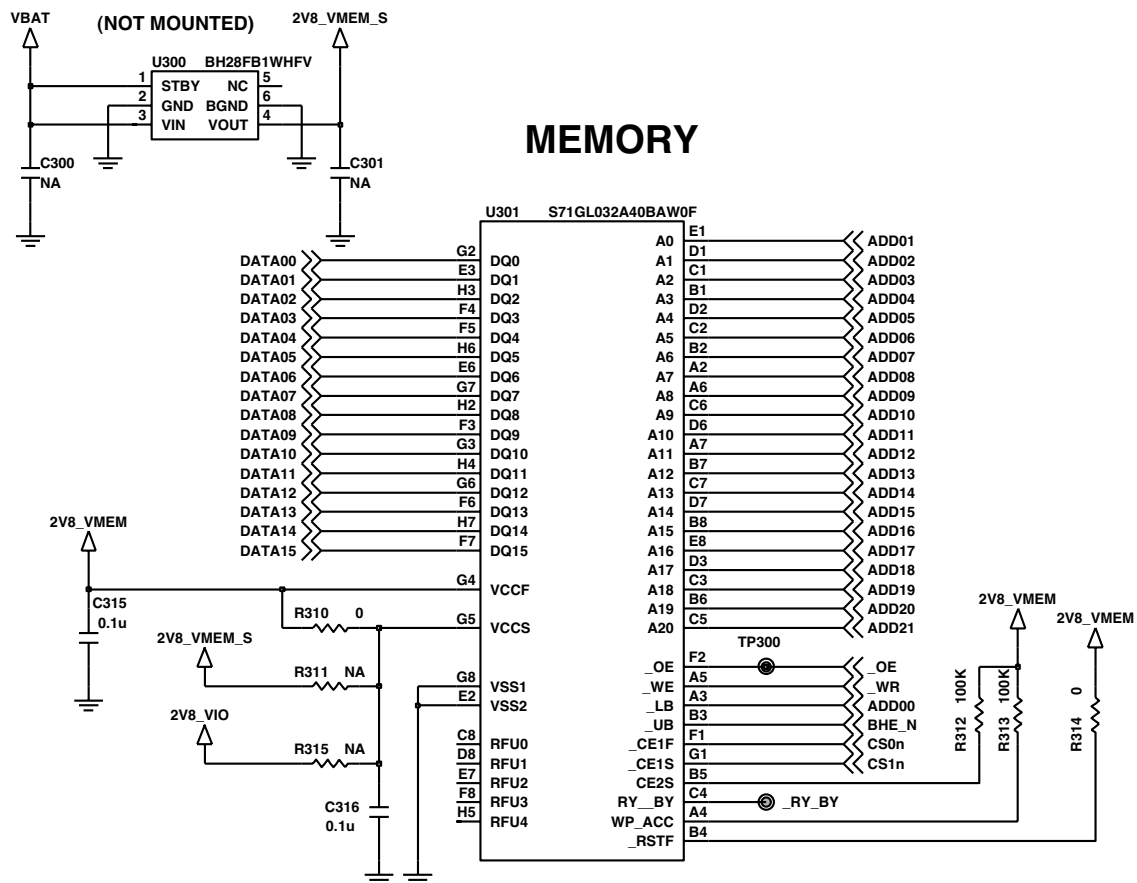
## VIBRATOR (Change Library)



**Figure 3-12 Vibrator interface**

This handset has vibrator operation. Control signal is controlled by EGold-voice with PWM.

## 3.13 Memory Interface



**Figure 3-13 Memory interface**

In E-GOLDvoice, the 16bits demultiplex X-bus interface is used for memory device support. NOR Flash memory is supported. (The NAND Flash memory is not supported). The page mode can be supported for flash memories.

Up to 8MBytes of external RAM and/or ROM can be connected to the MCU via its external bus interface.

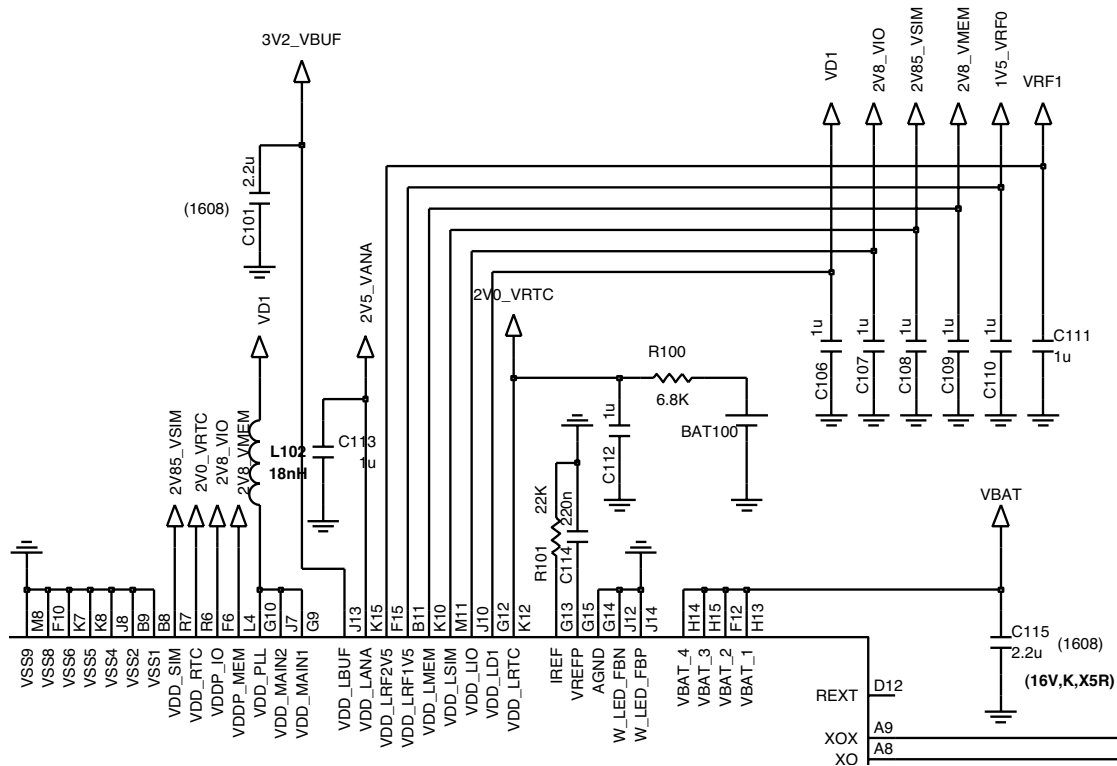
Up to 3 external CS signals can be generated to save external glue logic.

Access to very slow memories is supported via a special 'Ready' function.

The system MCU clock is set to run with 26Mhz.

### 3. TECHNICAL BRIEF

#### 3.14 Power Block Interface



**Figure 3-14-1 Power Block interface**

The E-GOLDvoice integrated power management unit (PMU) supports direct connection to battery (DCB). That means all supply voltages needed are generated on-chip with integrated linear voltage regulators. The input of these linear voltage regulators is the battery voltage. The external memory and SIM card supply is provided by the on-chip voltage regulators. Table 144 is an overview of the internal generated supply voltages.

The integrated power management also provides the control state machine for system start up, including start up with discharged batteries, trickle charging and system reset control. After system start up several methods are implemented for active and idle power saving.

### 3. TECHNICAL BRIEF

Name	Output Voltage(V)	Output Current (mA)	Comment
LRTC	2.0	4	Used for the real time and digital PMU supply
LD1	1.2/1.5	150	Used for the core supplies (MCU and DSP via switch)
LIO	1.8/2.85	30	Used for the I/O pad supply and, for example, the display
LRFXO	2.5	10	Used for the crystal oscillator supply
LMEM	2.5	100	Used for the external memory supply, voltage can be configured during startup
LANA	2.5	100	Used for analog (audio and baseband processing) and headset driver
LSIM	1.8/2.85	30	Used of the SIM card supply
LBUF	2.6/2.8/3.0/3.2	300	Used for the loudspeaker and earpiece driver
LRFRX	2.5	100	Used for the RF RX part
LRFTRX	1.5	120	Used for the RF TX/TX part

**Figure 3-14-2 EGold Voice PMU**

#### LDO output voltage selection

- LD1, LIO, LSIM, LBUF output voltage programmable by software.
- LMEM output voltage is selectable by pin configuration upon startup.

#### Active and idle power saving options:

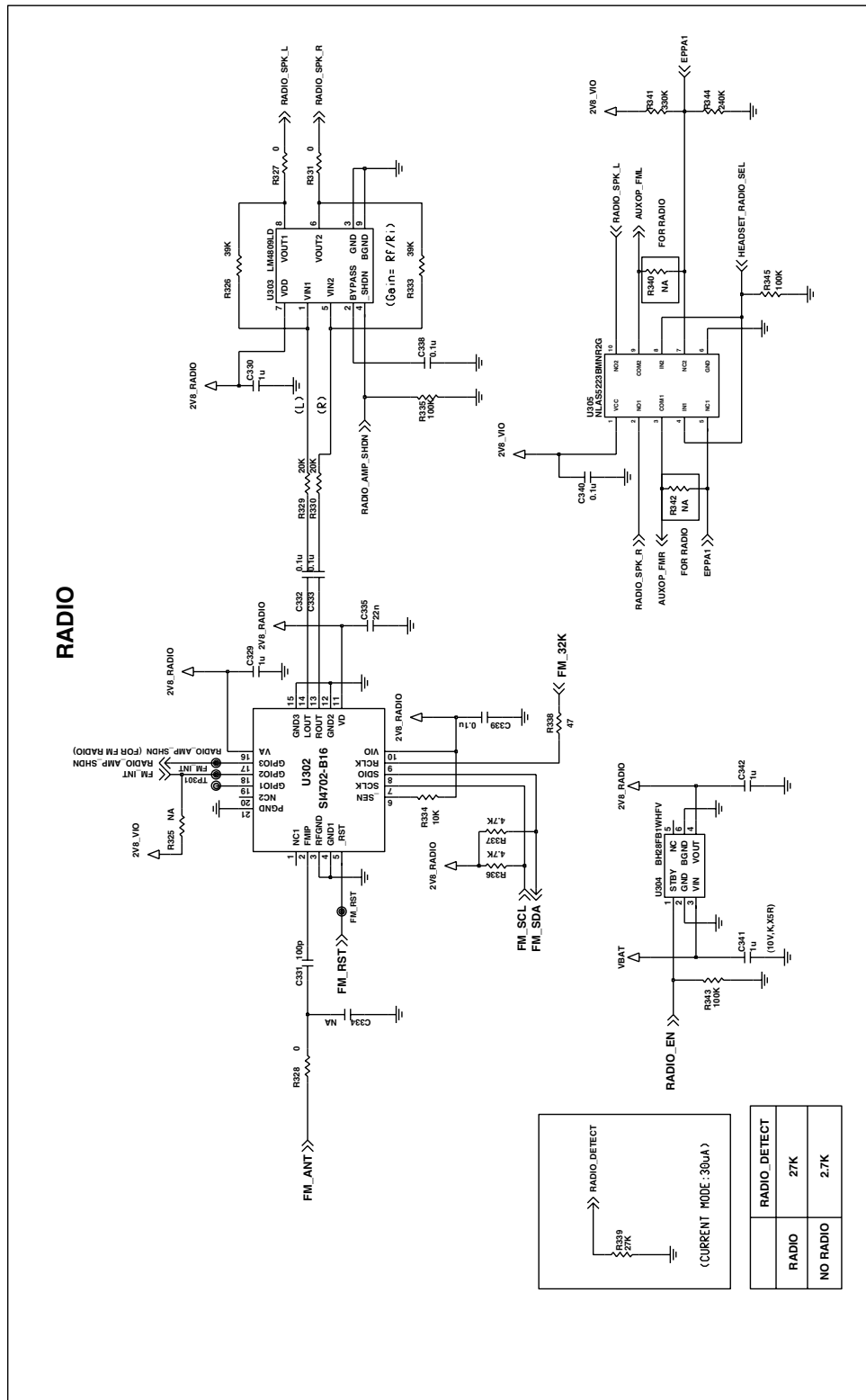
- The flexible clock switching options allow minimizing the power consumption during the operation phases of the E-GOLDvoice.
- Current consumption during the standby mode is minimized by reducing the clock to 32 kHz and switching it off for most of the device. In addition, the power supply for the TEAKLite ROM is switched off and the controller RAM is switched to a power saving mode.

#### Start-up and Reset Control State Machine Features

- Power up upon battery insertion, push button, alarm, charger connection.
- Detection of battery exchange or re-insertion.
- Complete start-up sequence management.
- System turn-on, system turn-off operation management including emergency (under-voltage) and programmed shutdown functions.
- Internal reset of the baseband, including silent reset.
- Tri-state function of the baseband module.
- Standby mode controlled by VCXO\_EN provided by SCCU module.



### 3.15 FM Radio Interface



### 3.15.1 FM Tunner

The Si4702 patented digital low-IF architecture reduces external components and eliminates the need for factory adjustments. The receive (RX) section integrates a low noise amplifier (LNA) supporting the worldwide FM broadcast band (76 to 108 MHz). An automatic gain control (AGC) circuit controls the gain of the LNA to optimize sensitivity and rejection of strong interferers.

For two-wire operation, a transfer begins with the START condition. The control word is latched internally on rising SCLK edges and is eight bits in length, comprised of a seven bit device address equal to 0010000b and a read/write bit (write = 0 and read = 1). The device acknowledges the address by setting SDIO low on the next falling SCLK edge. For write operations, the device acknowledge is followed by an eight bit data word latched internally on rising edges of SCLK.

The device always acknowledges the data by setting SDIO low on the next falling SCLK edge. An internal address counter automatically increments to allow continuous data byte writes, starting with the upper byte of register 02h, followed by the lower byte of register 02h, and onward until the lower byte of the last register is reached. The internal address counter then automatically wraps around to the upper byte of register 00h and proceeds from there until continuous writes cease. Data transfer ceases with the STOP command. After every STOP Command, The internal address counter is reset. For read operations, the device acknowledge is followed by an eight bit data word shifted out on falling SCLK edges. An internal address counter automatically increments to allow continuous data byte reads, starting with the upper byte of register 0Ah, followed by the lower byte of register 0Ah, and onward until the lower byte of the last register is reached. The internal address counter then automatically wraps around to the upper byte of register 00h and proceeds from there until continuous reads cease. After each byte of data is read, the controller IC should return an acknowledge if an additional byte of data will be requested. Data transfer ceases with the STOP command. After every STOP command, the internal address counter is reset.

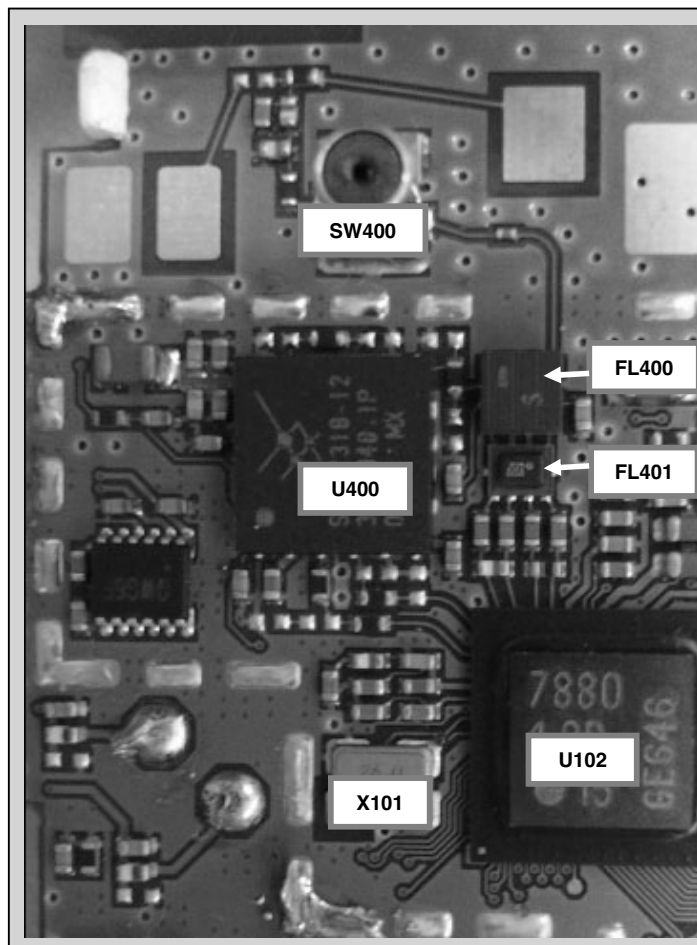
### 3.15.2 Headphone Amplifier

The MAX4411 fixed-gain, stereo headphone driver features Maxim's patented DirectDrive architecture, eliminating the large output-coupling capacitors required By conventional single-supply headphone drivers. The device consists of two 80mW Class AB headphone drivers, internal feedback network (fixed -1.5V/V gain), undervoltage lockout (UVLO)/shutdown control, charge pump, and comprehensive click-and-pop suppression circuitry.

## 4. TROUBLE SHOOTING

## 4. TROUBLE SHOOTING

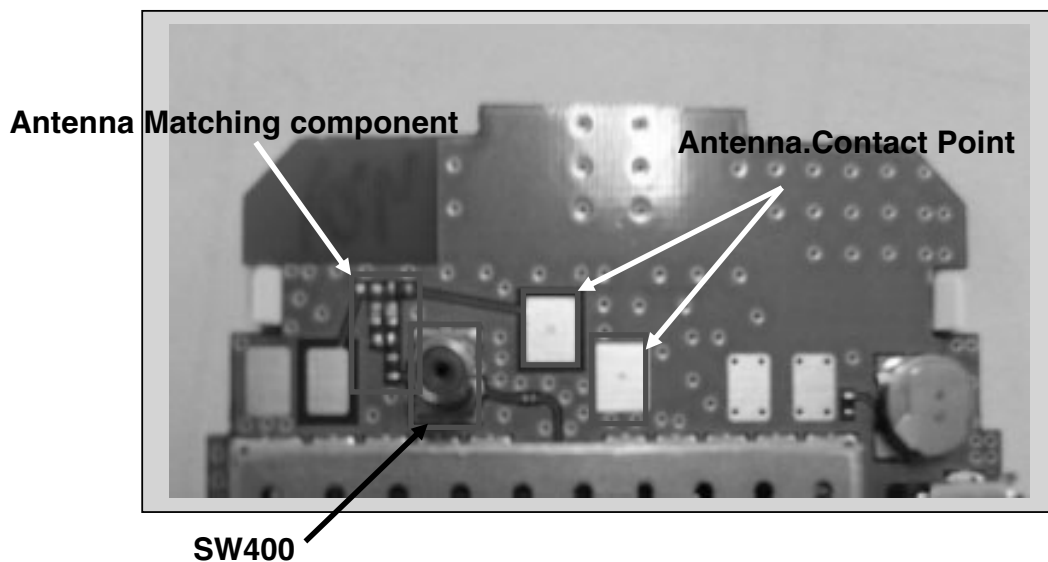
### 4.1 RF Trouble



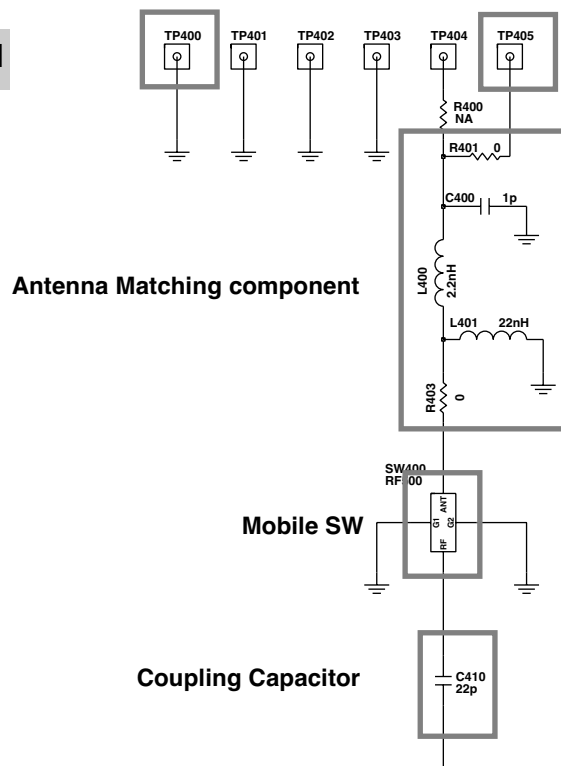
REFERENCE	PART Description
U400	PAM (Power Amp. Module)
X101	DCXO (26MHz)
FL400	ASM (Antenna Switch Module)
SW400	Mobile Switch
FL401	RX SAW Filter

### RF Trouble

#### TEST POINT



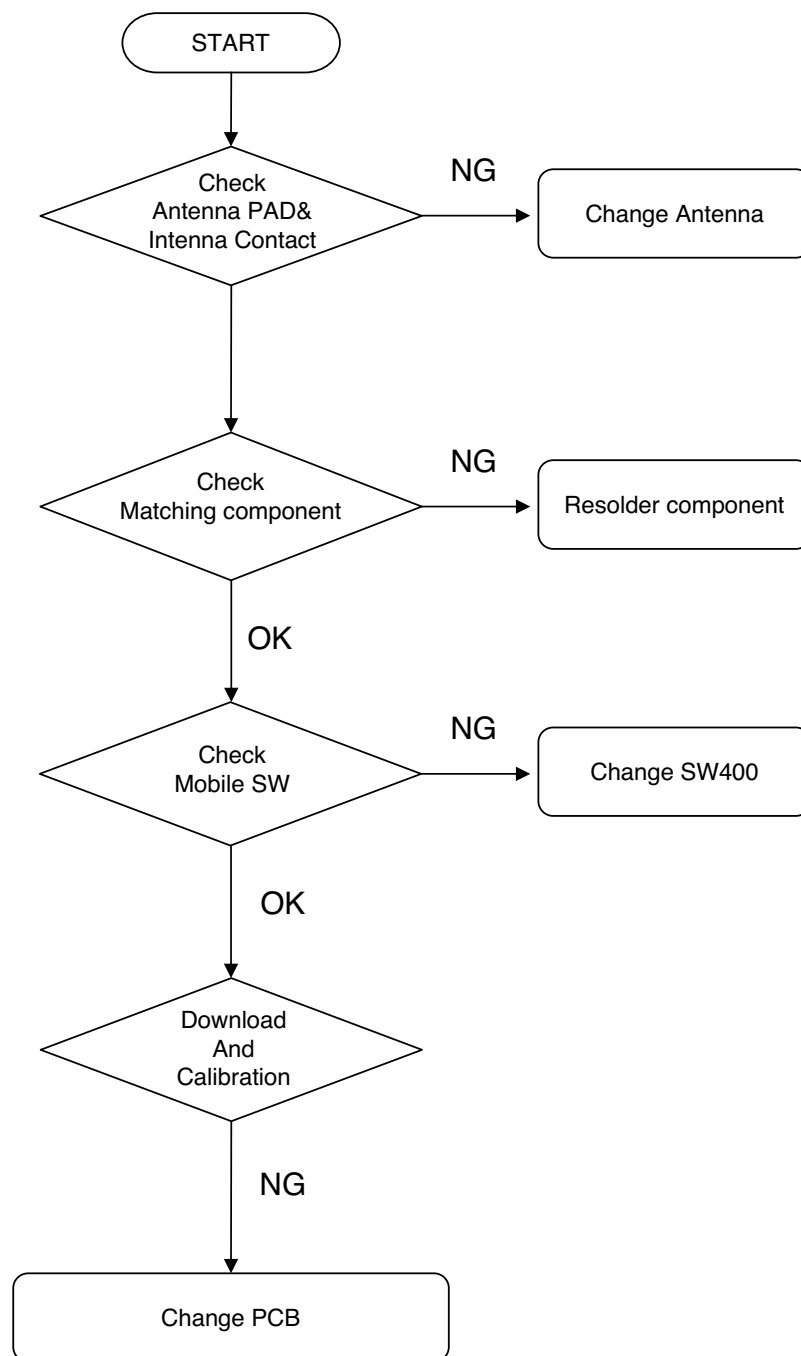
#### CIRCUIT DIAGRAM



## 4. TROUBLE SHOOTING

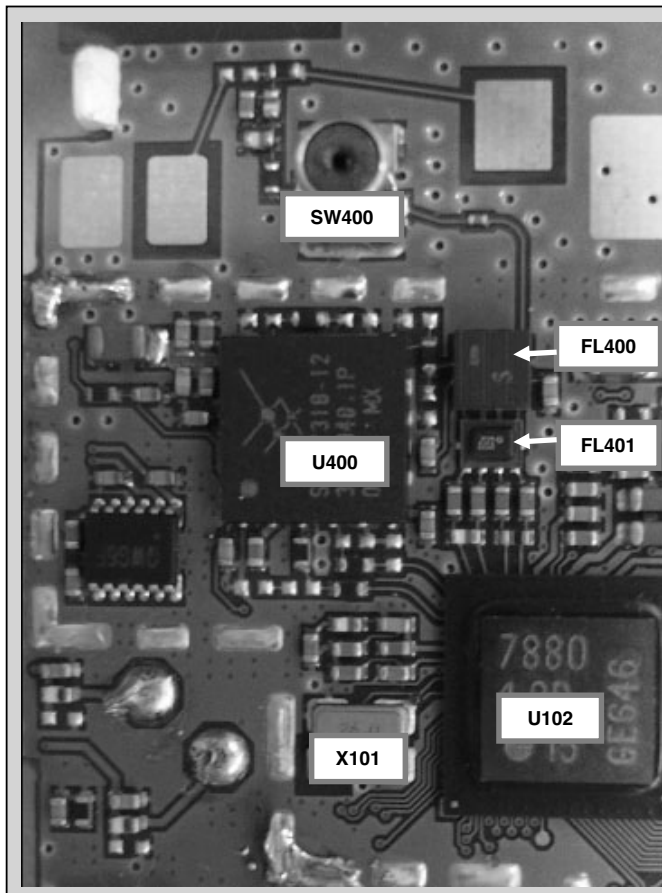
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### CHECKING FLOW

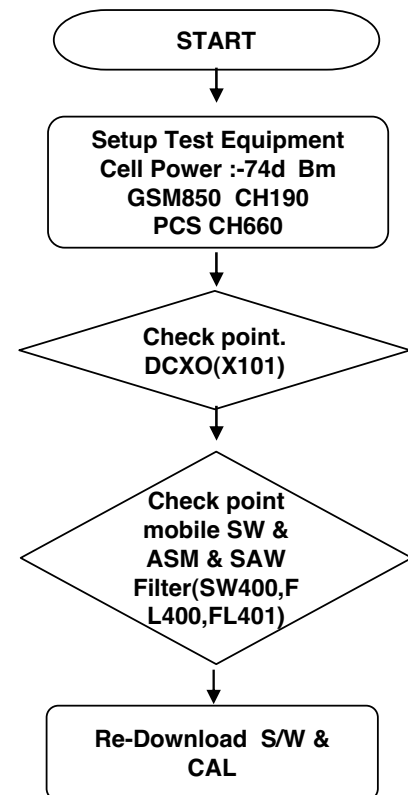


### RX Trouble

#### TEST POINT



#### CHECKING FLOW

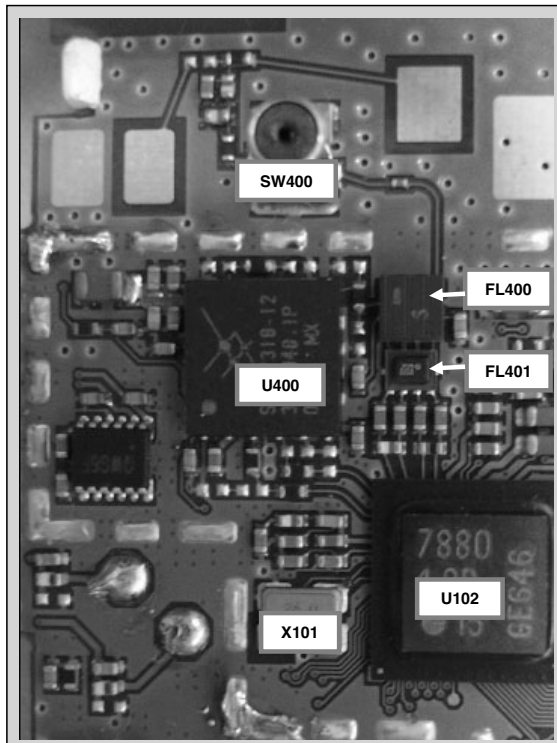


## 4. TROUBLE SHOOTING

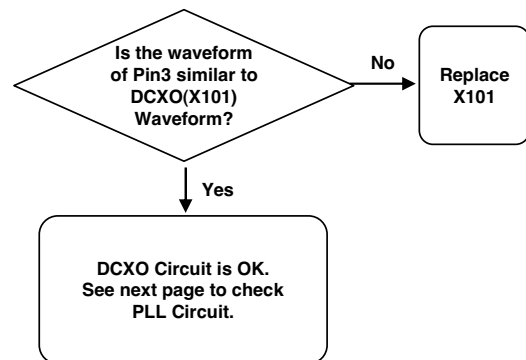
### RX Trouble

#### (1) Checking VCTCXO Circuit

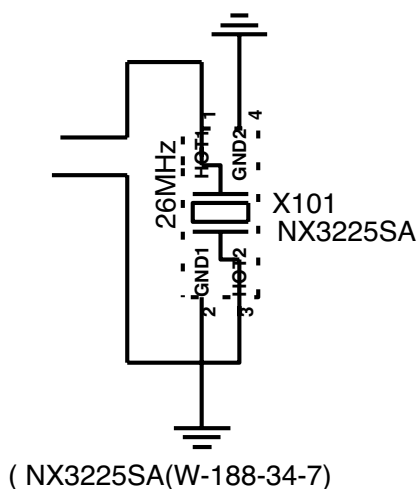
##### TEST POINT



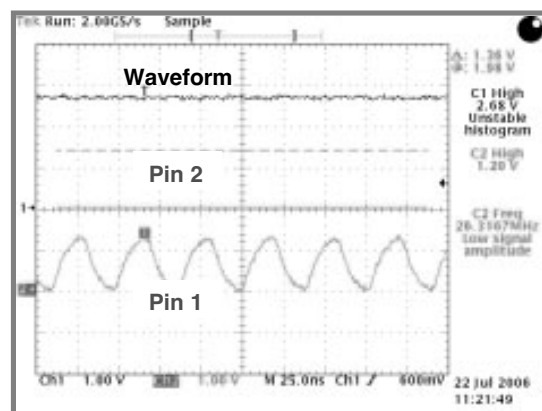
##### CHECKING FLOW



##### CIRCUIT



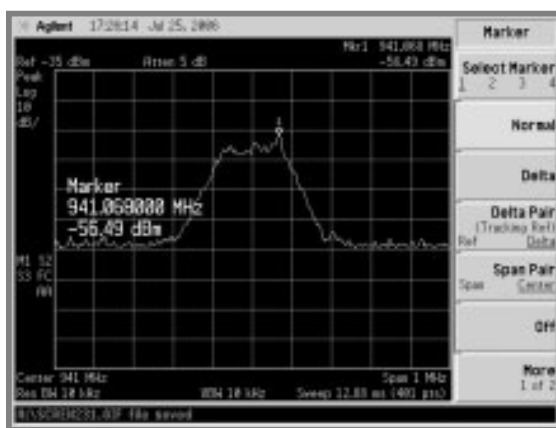
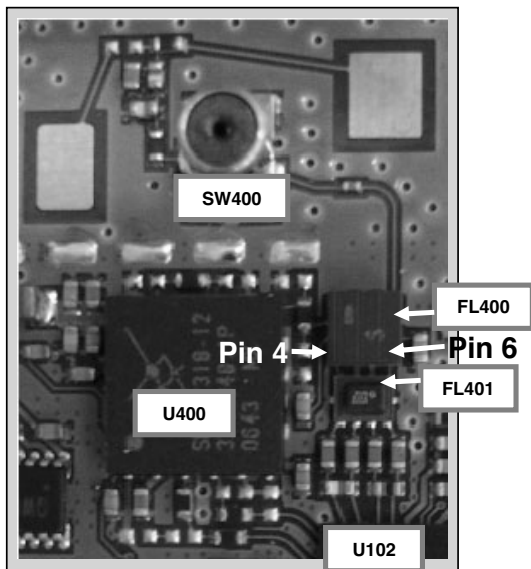
##### Waveform



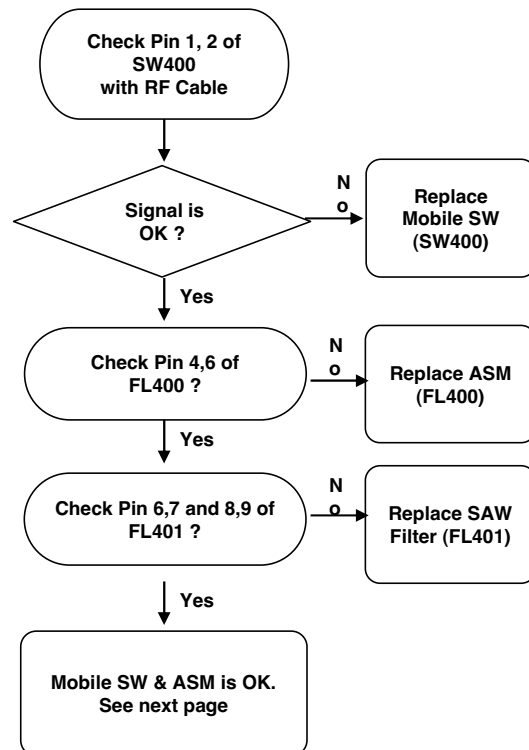
## 4. TROUBLE SHOOTING

### RX Trouble

#### TEST POINT



#### CHECKING FLOW



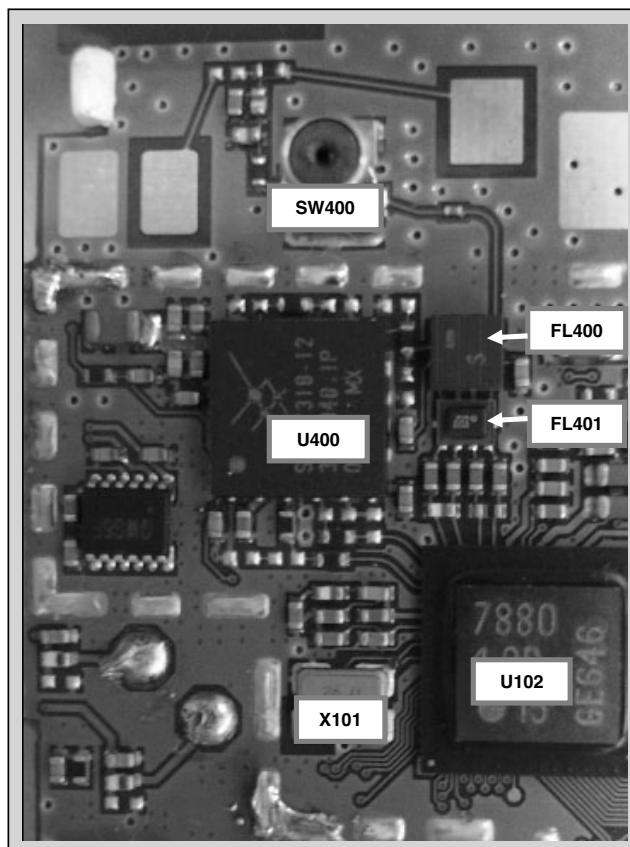
**\* FL401 6,7 and 8,9 output are balanced**



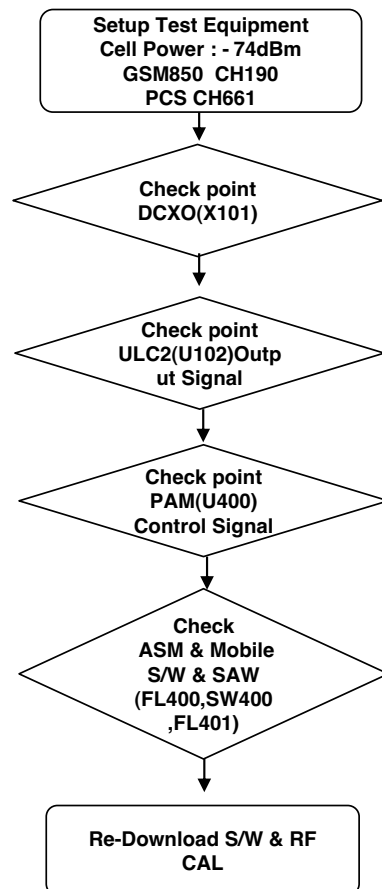
## 4. TROUBLE SHOOTING

### 4.2 TX Trouble

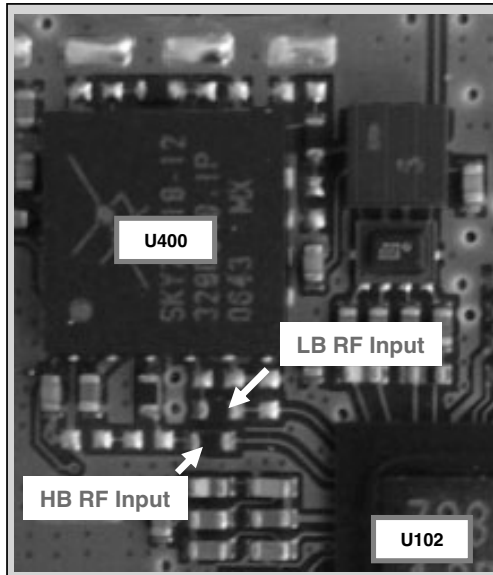
#### TEST POINT



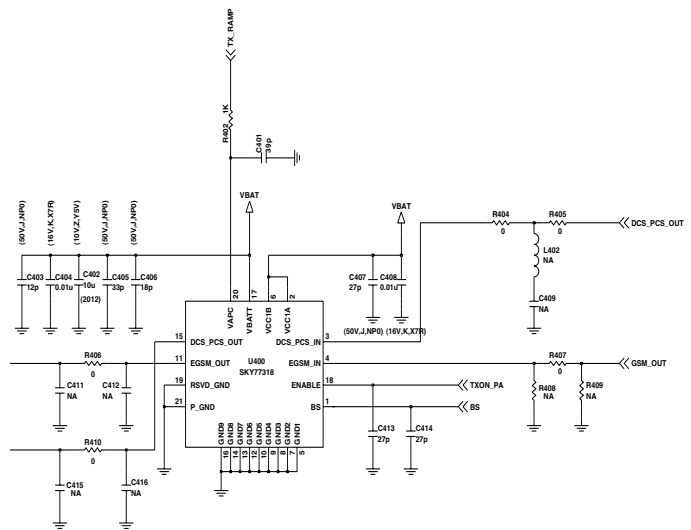
#### CHECKING FLOW



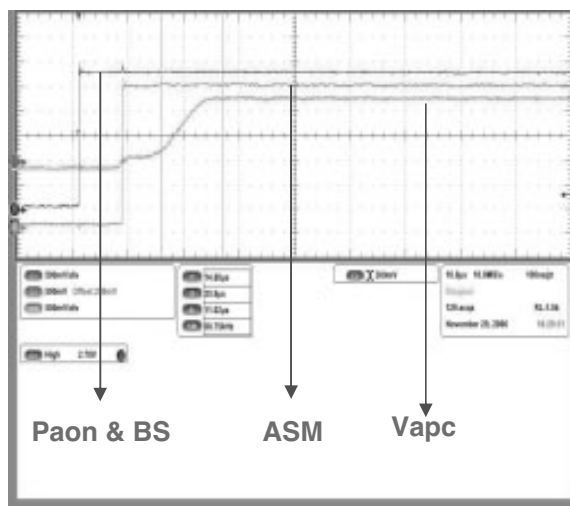
### TEST POINT



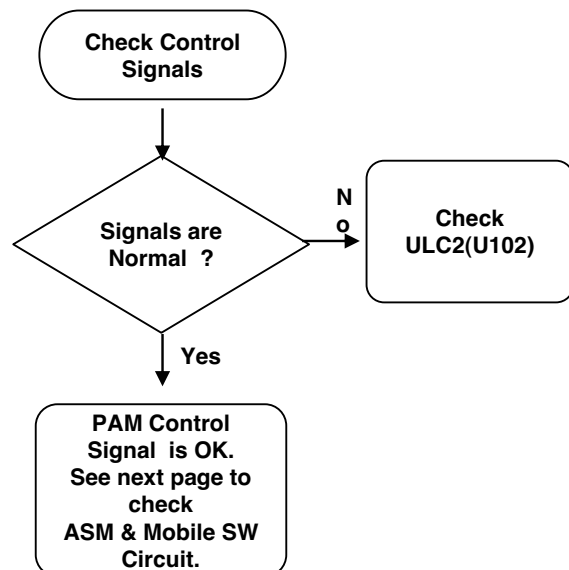
## CIRCUIT



### Waveform



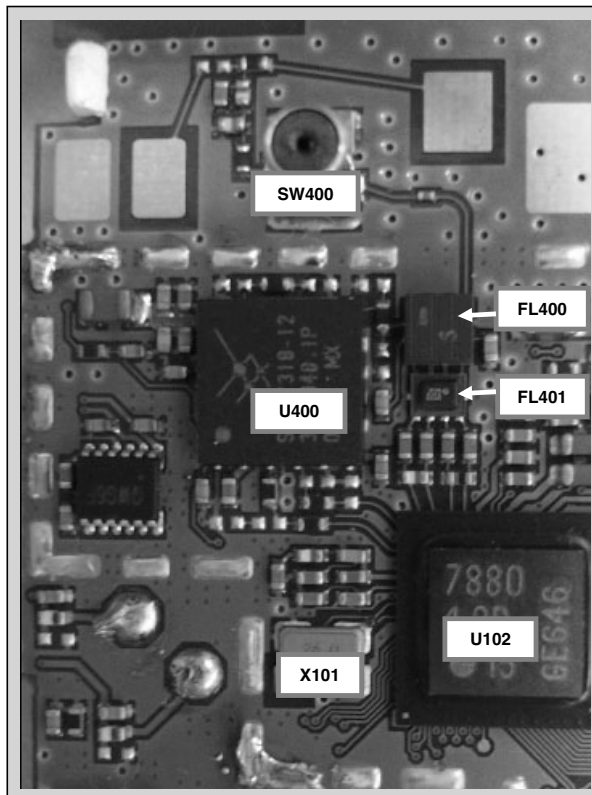
## CHECKING FLOW



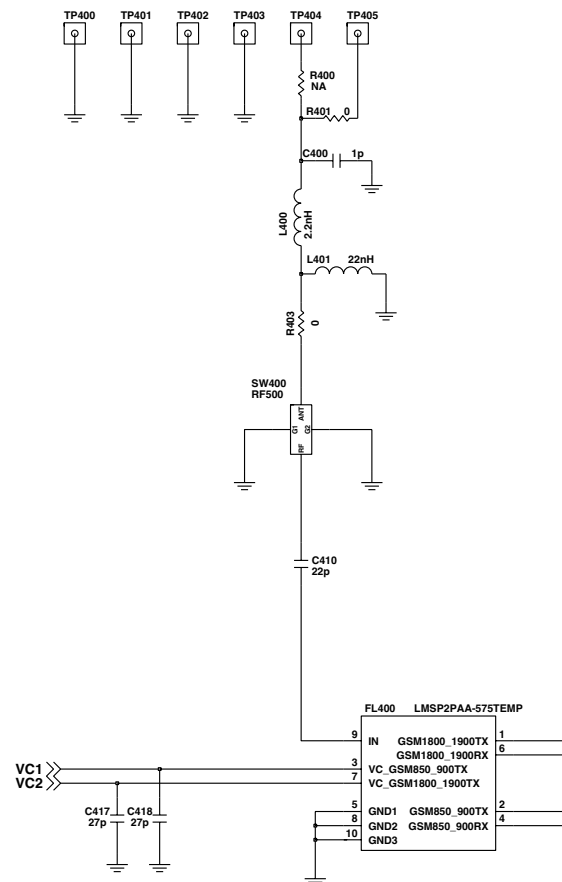
## 4. TROUBLE SHOOTING

### TX Trouble

#### TEST POINT



#### CIRCUIT

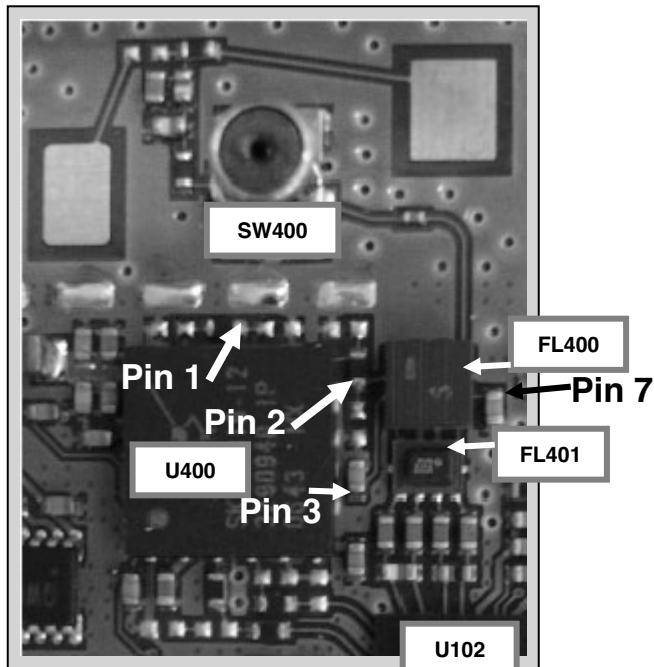


Mode	GSM900 TX	DCS1800 TX	GSM800 RX	DCS1800 RX
VC1	H(2.7V)	L	L	L
VC2	L	H(2.7V)	L	L

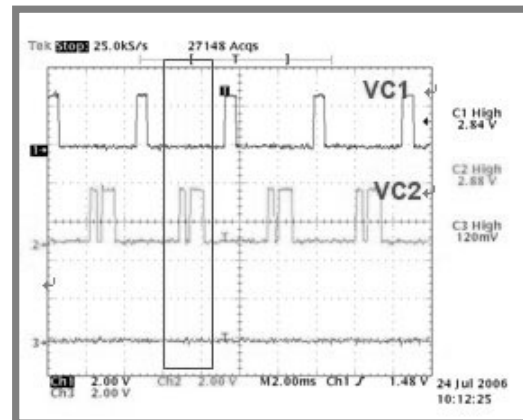
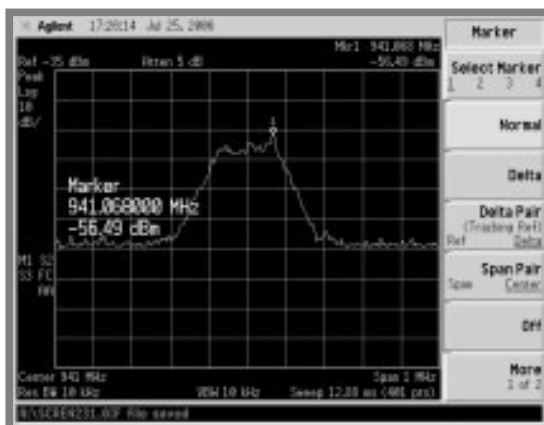
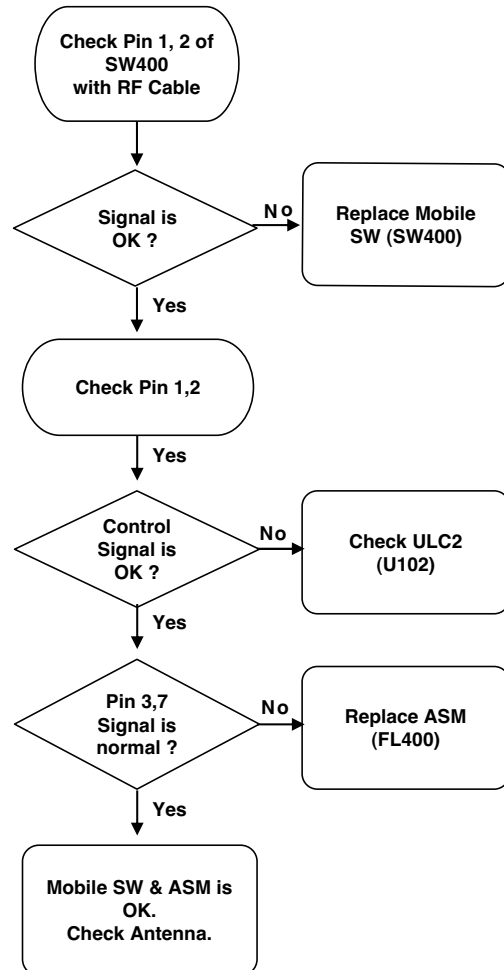
## 4. TROUBLE SHOOTING

### RX Trouble

#### TEST POINT



#### CHECKING FLOW



## 4. TROUBLE SHOOTING

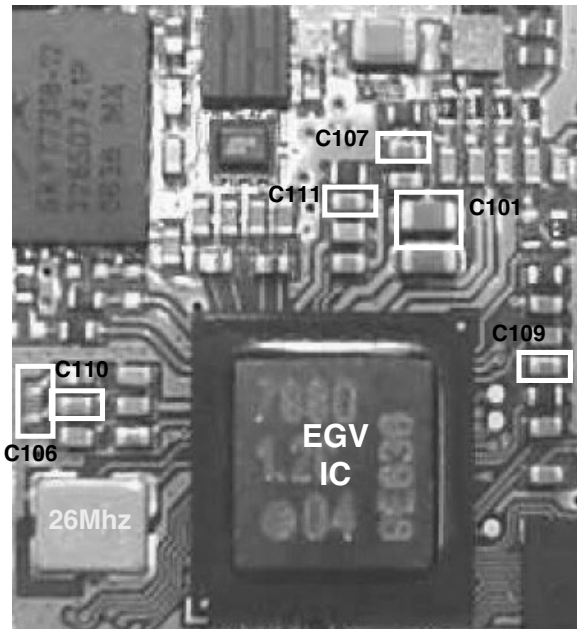
### 4.3 Power On Trouble

#### TEST POINT

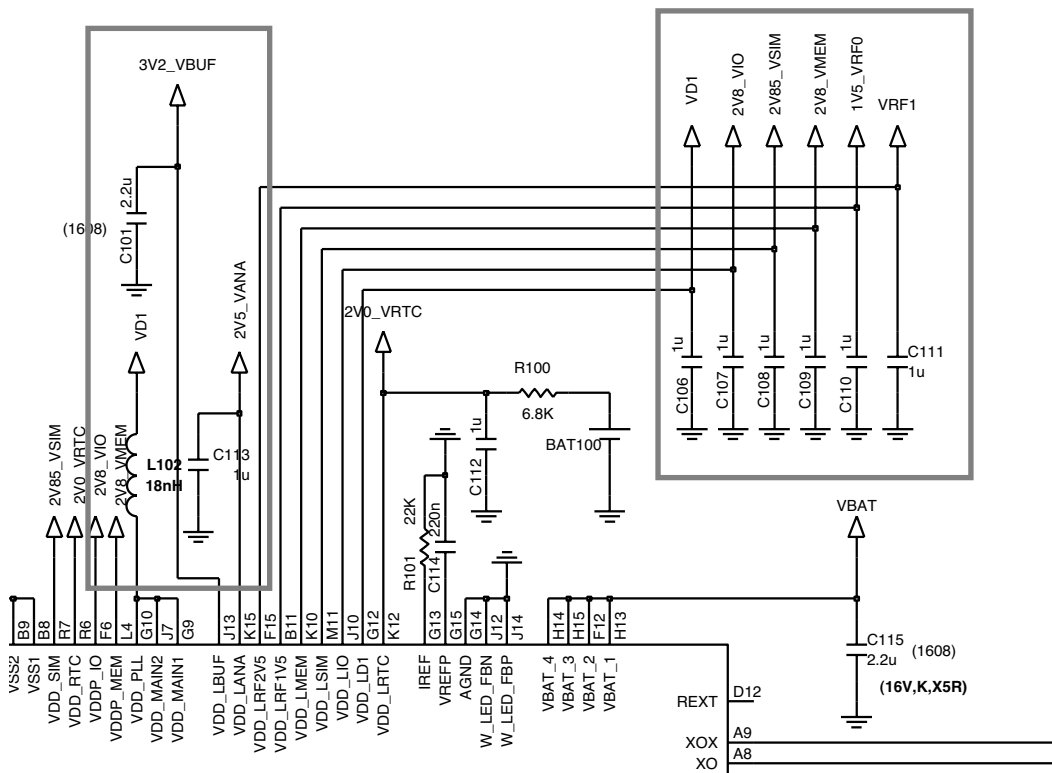
##### Check Points

- Battery Voltage( Need to over 3.35V)
- Power-On Key detection (PWRON signal)
- Outputs of LDOs from EGV

LDO	VOLTAGE	PART
V_BUF	3.2V	C101
V_MEM	2.8V	C109
V_IO	2.8V	C107
V_SIM	2.85V	C108
VRF0	1.5V	C110
V_ANA	2.5V	C113

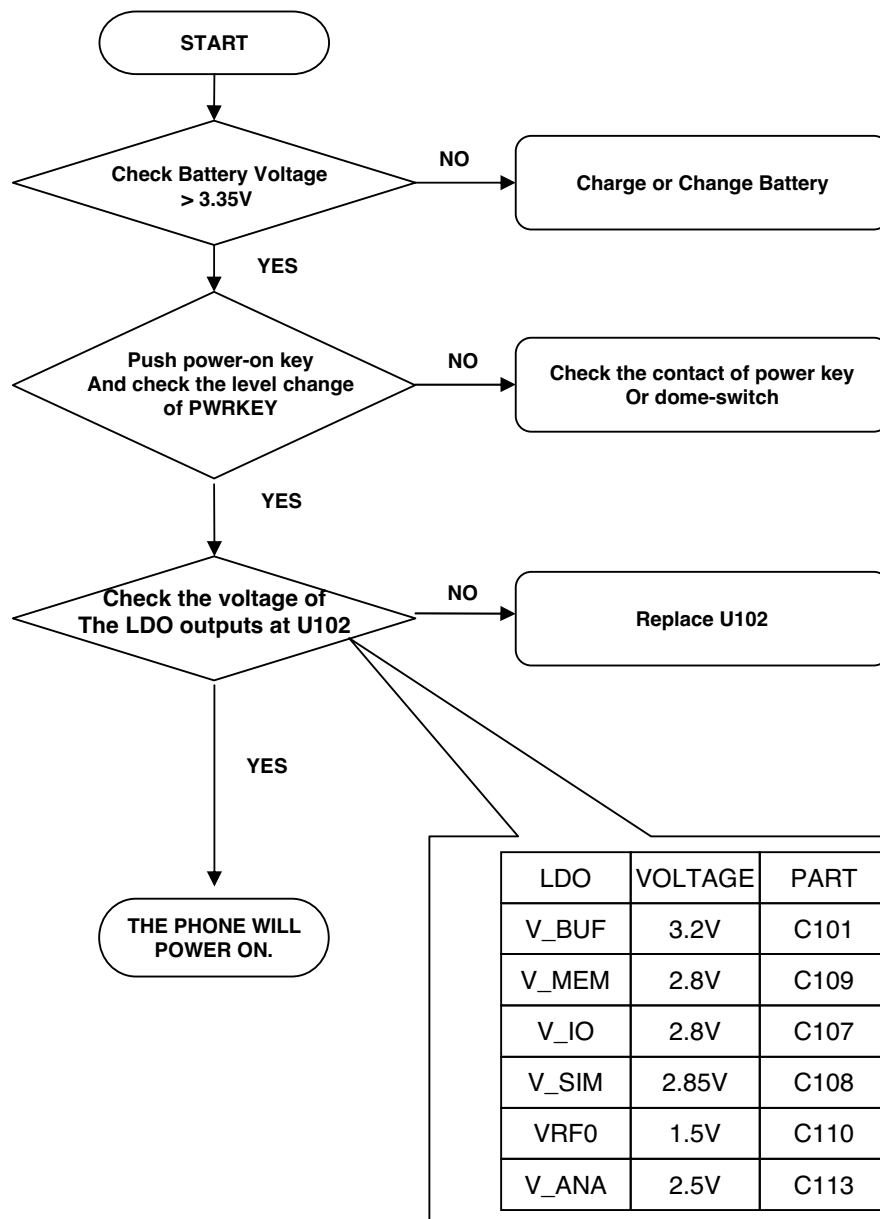


#### CIRCUIT



### Power On Trouble

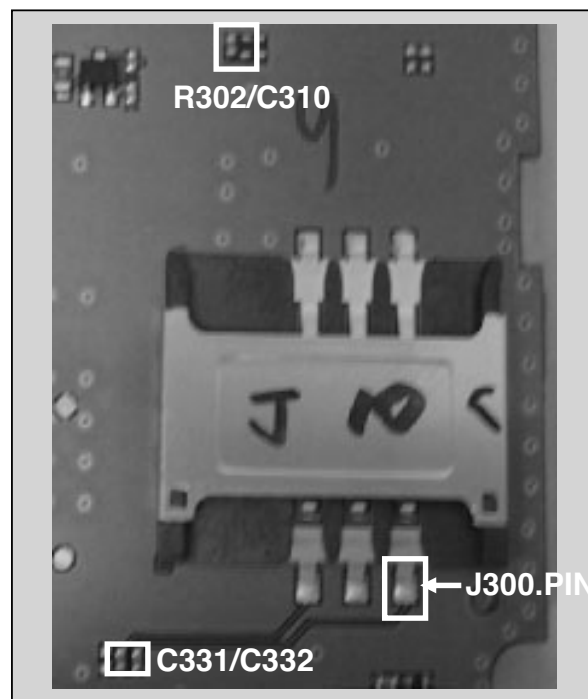
#### CHECKING FLOW



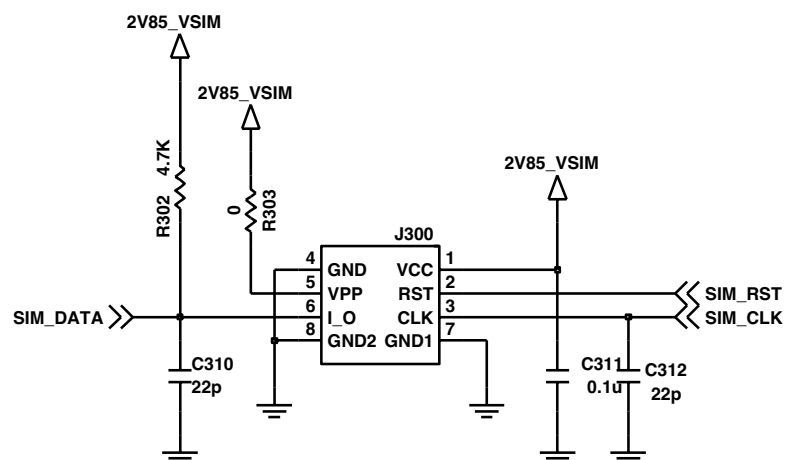
## 4. TROUBLE SHOOTING

### 4.4. SIM Card Trouble

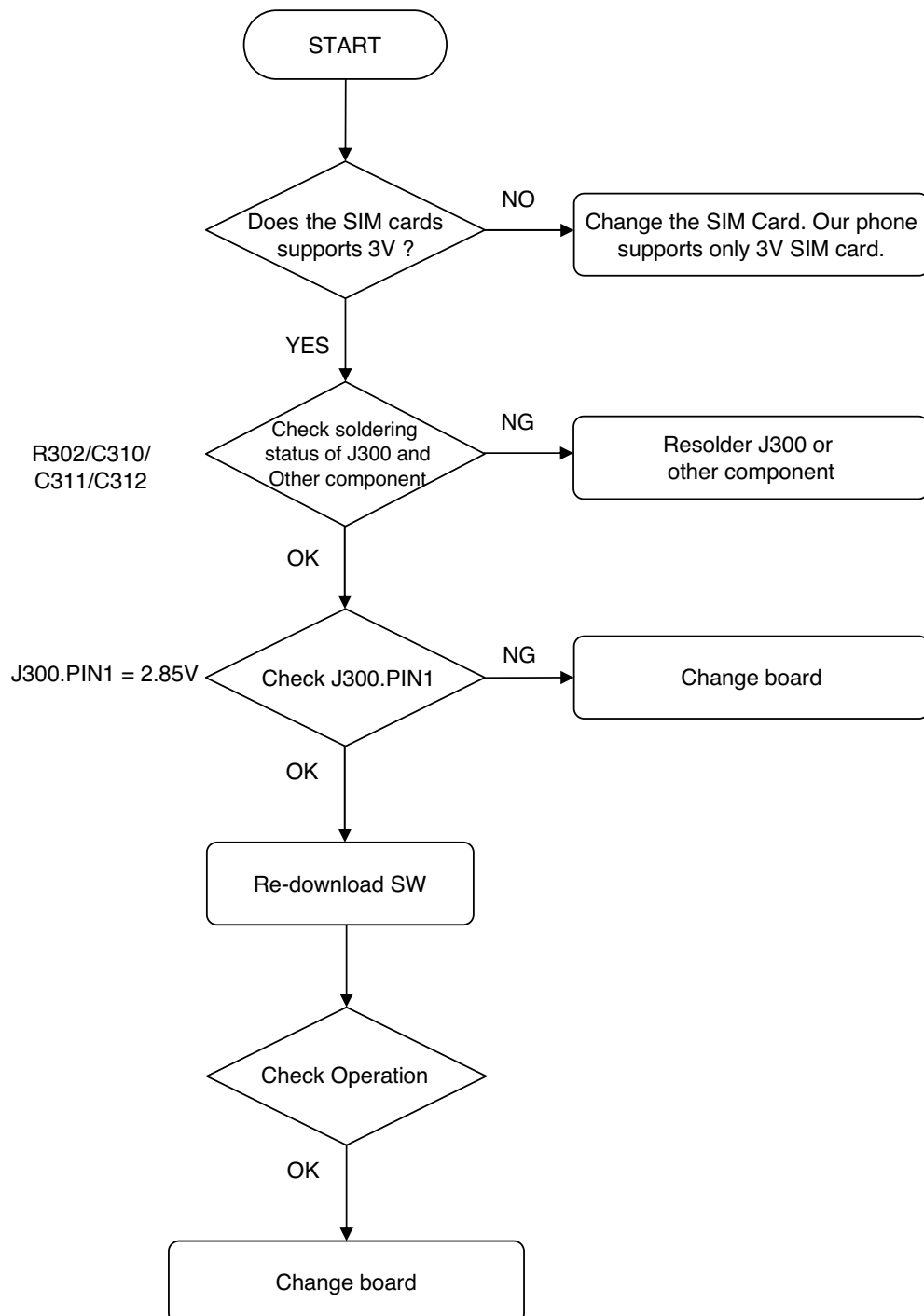
#### TEST POINT



#### CIRCUIT DIAGRAM



### Checking Flow

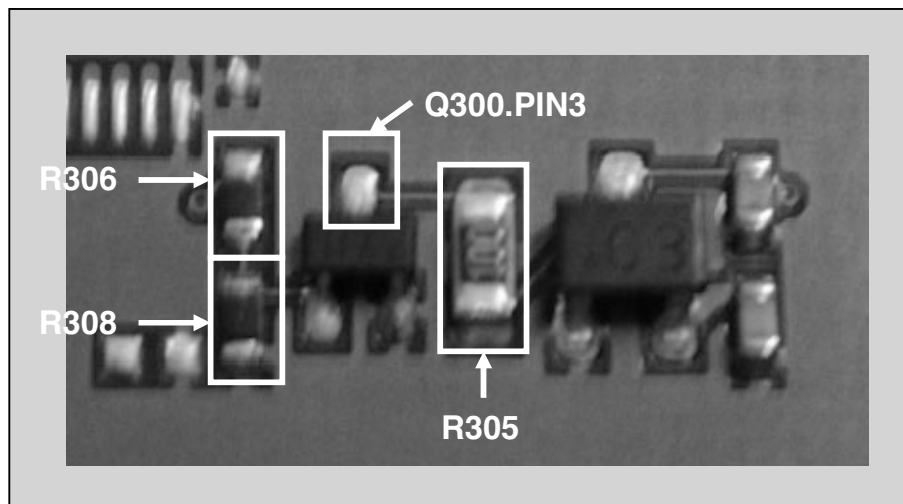




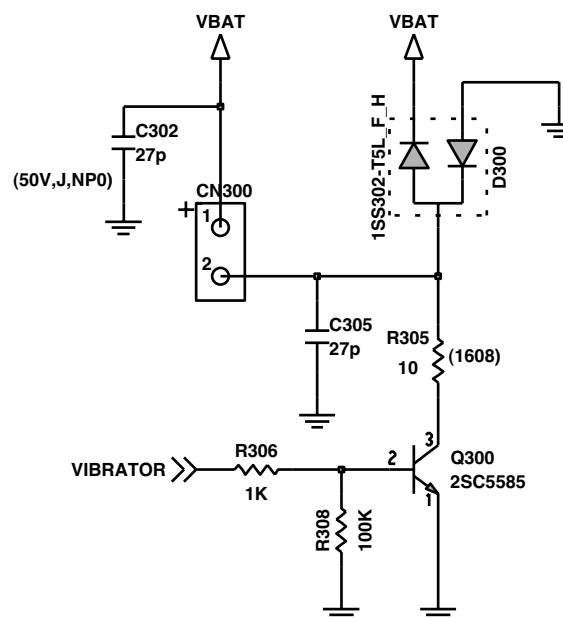
## 4. TROUBLE SHOOTING

### 4.5. Vibrator Trouble

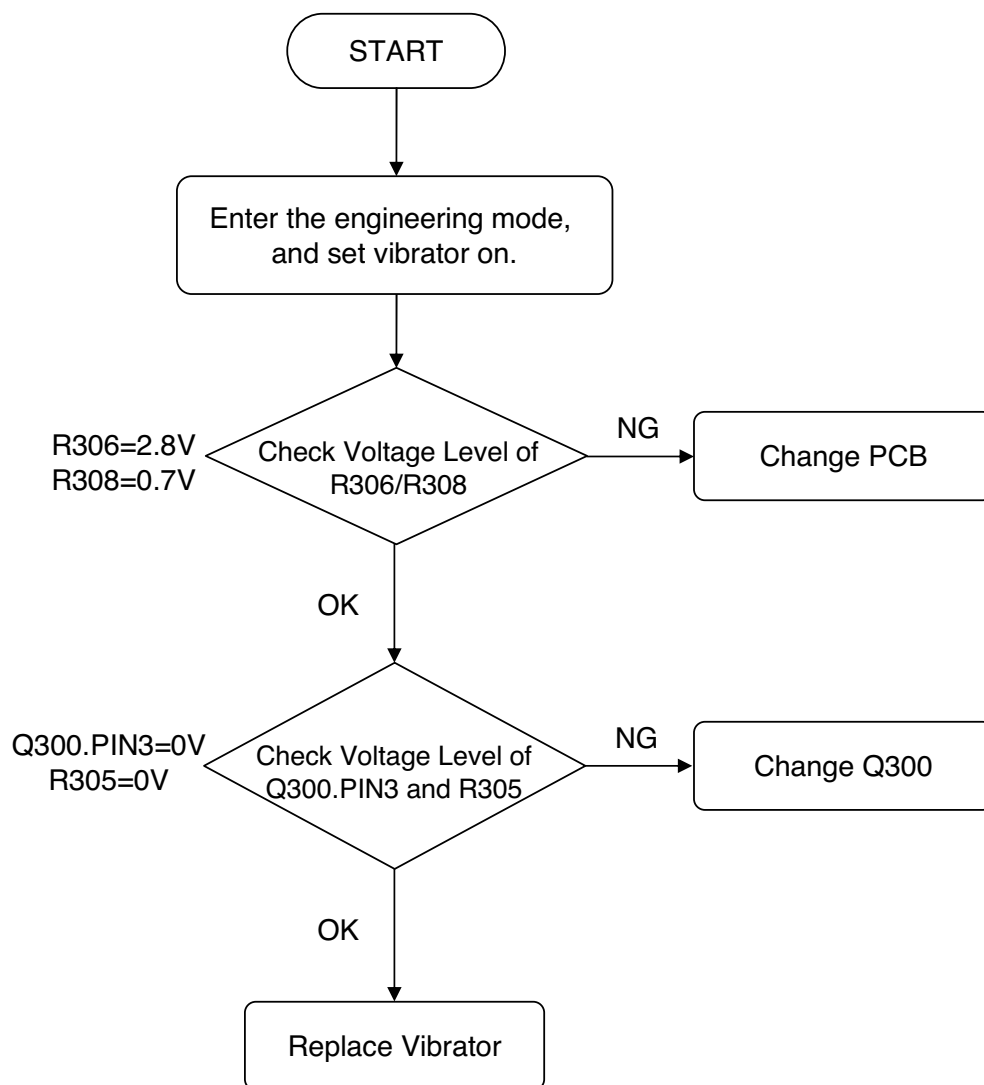
#### TEST POINT



#### CIRCUIT DIAGRAM



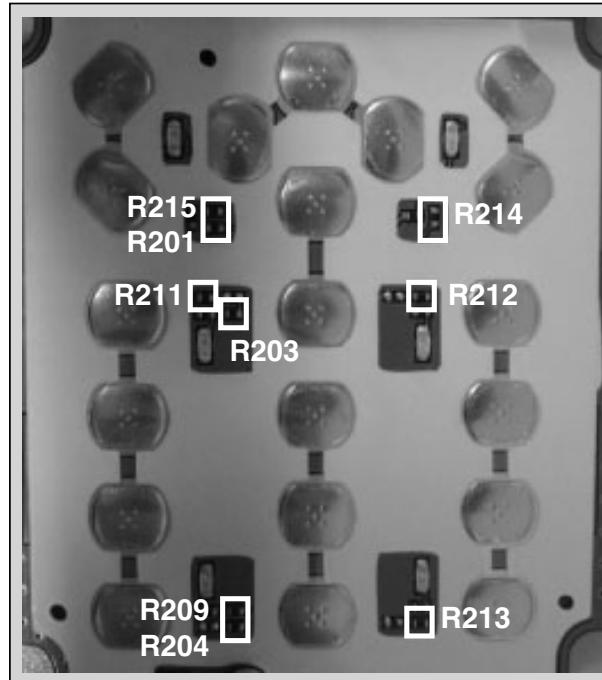
### Checking Flow



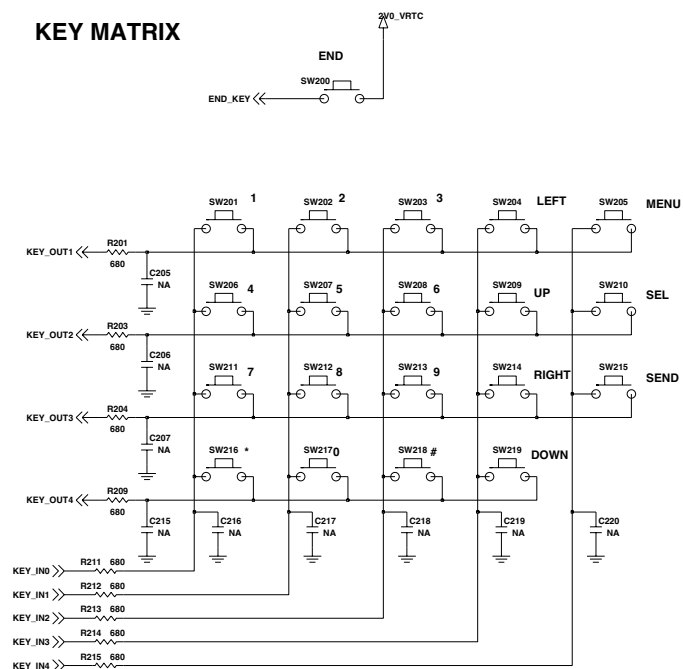
## 4. TROUBLE SHOOTING

### 4.6. Keypad Trouble

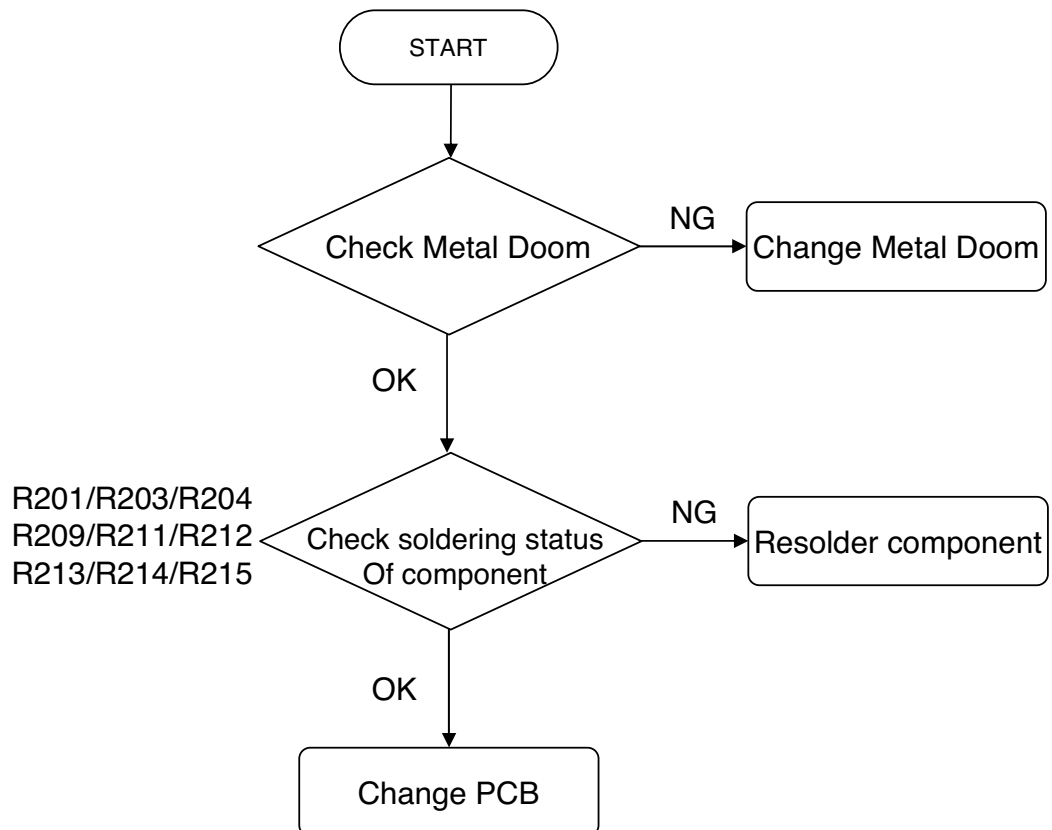
#### TEST POINT



#### CIRCUIT DIAGRAM



### Checking Flow



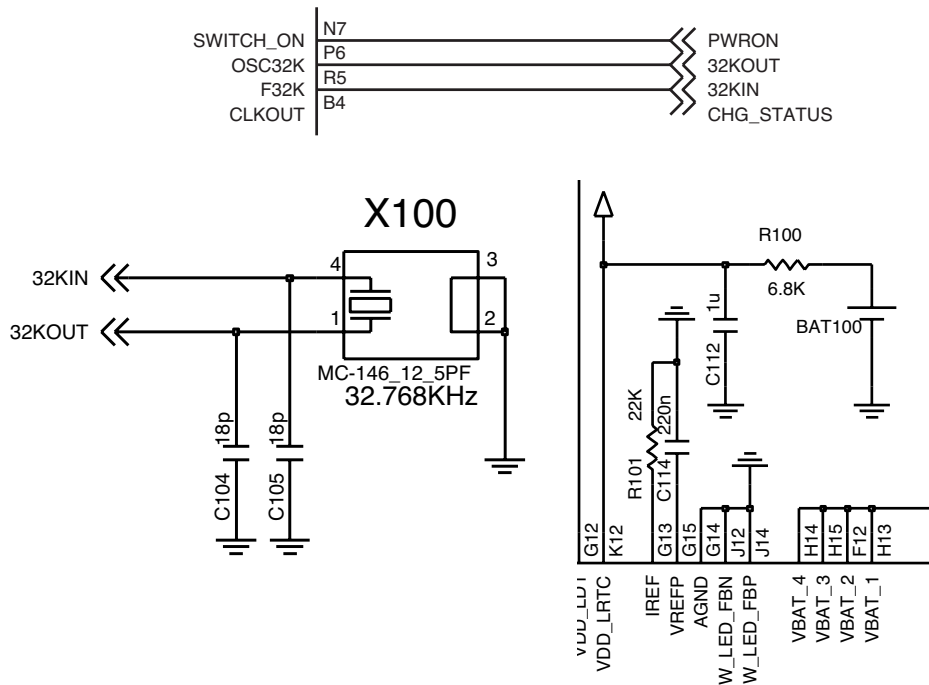
## 4. TROUBLE SHOOTING

### 4.7 RTC Trouble

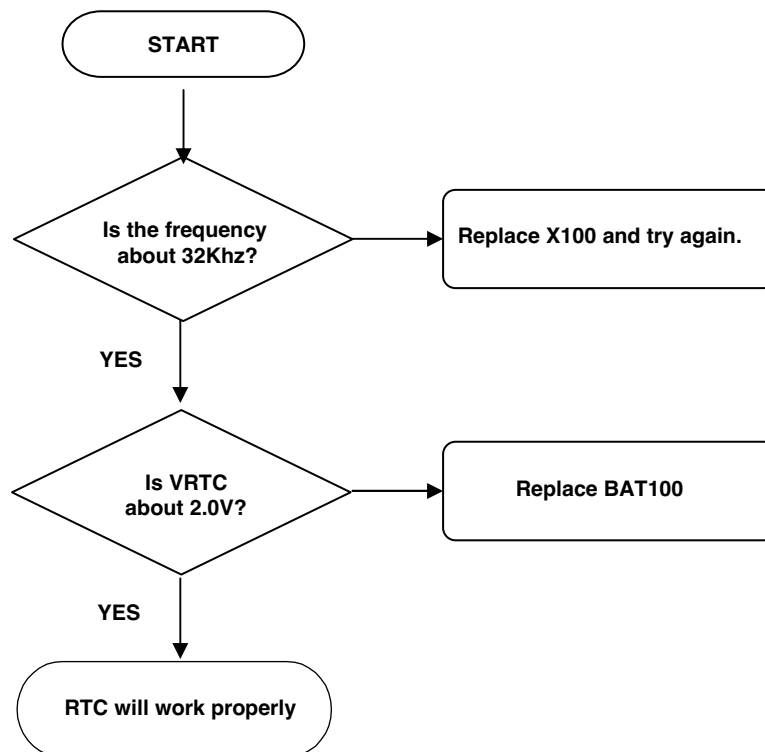
#### CIRCUIT

#### Check Points

- 32.768KHz is right clock
- The power of RTC is right.



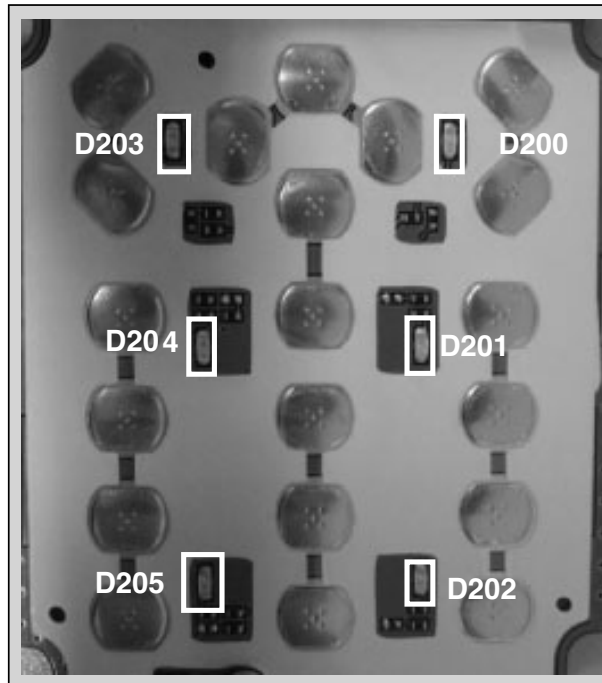
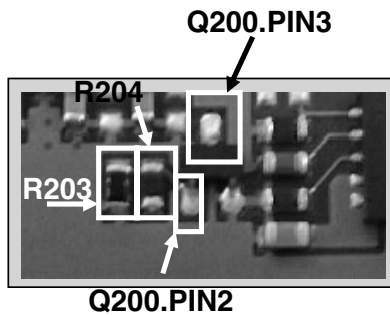
### CHECKING FLOW



## 4. TROUBLE SHOOTING

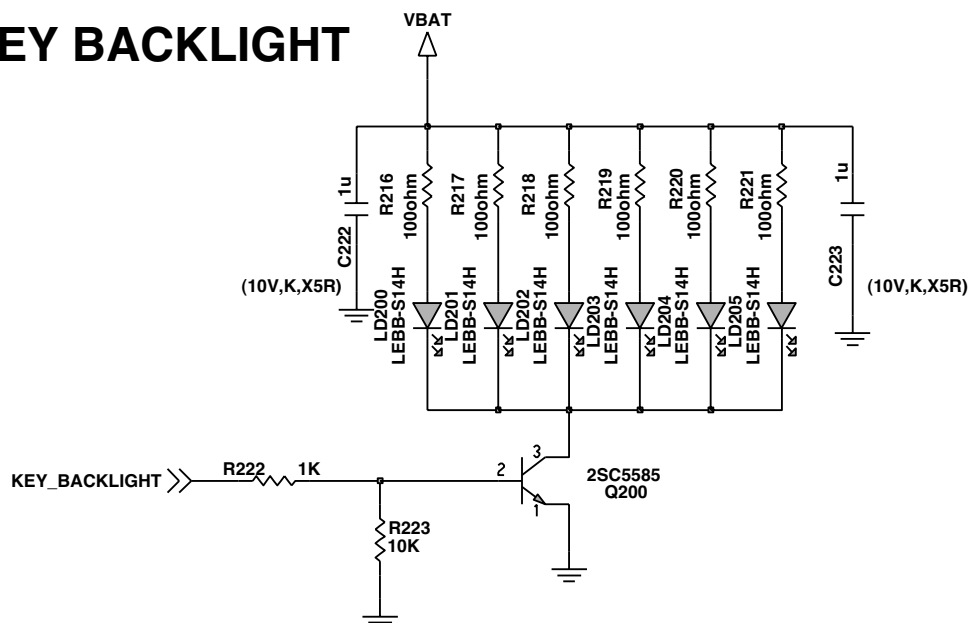
### 4.8. Key backlight Trouble

#### TEST POINT

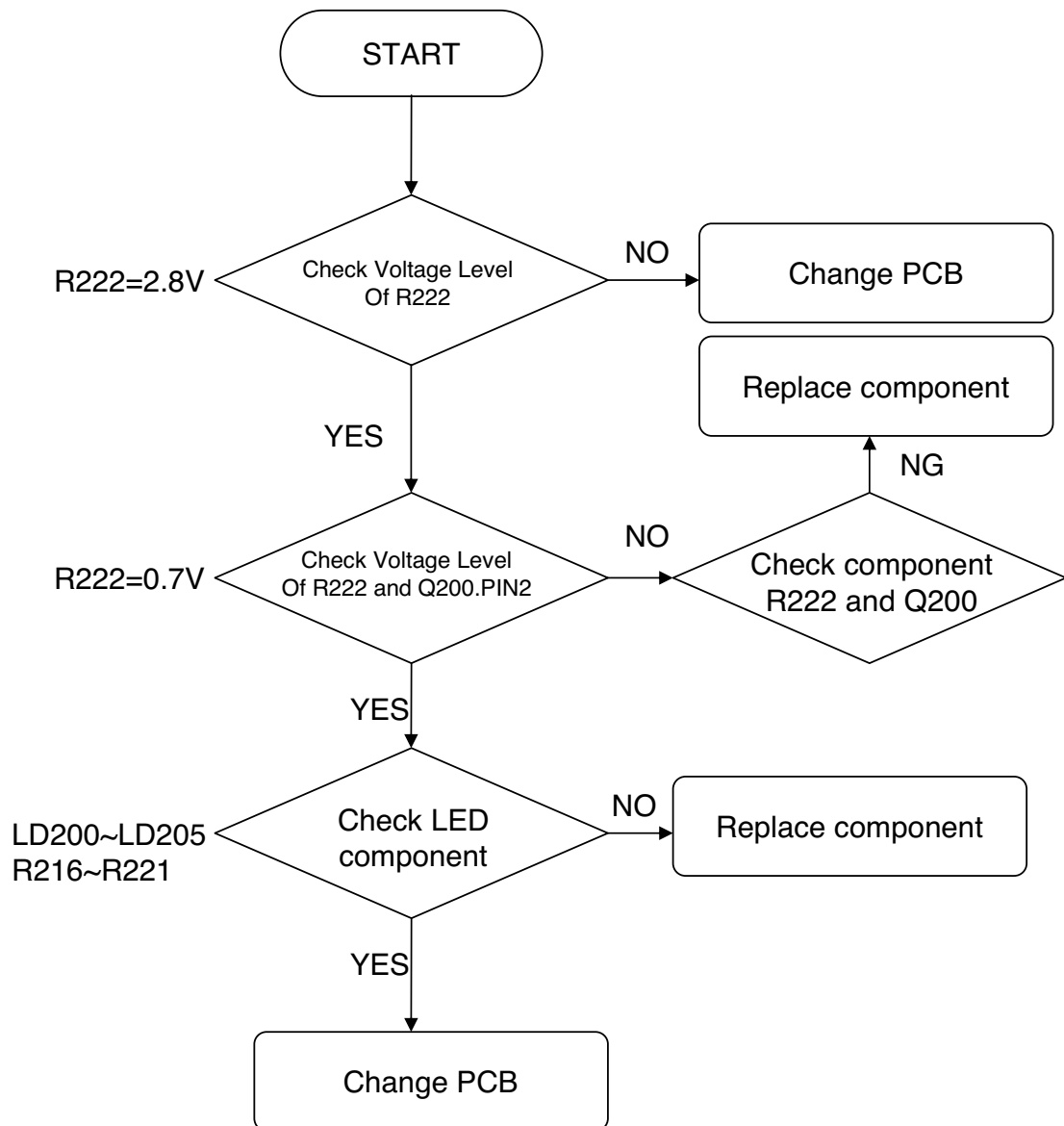


#### CIRCUIT DIAGRAM

### KEY BACKLIGHT



### Checking Flow

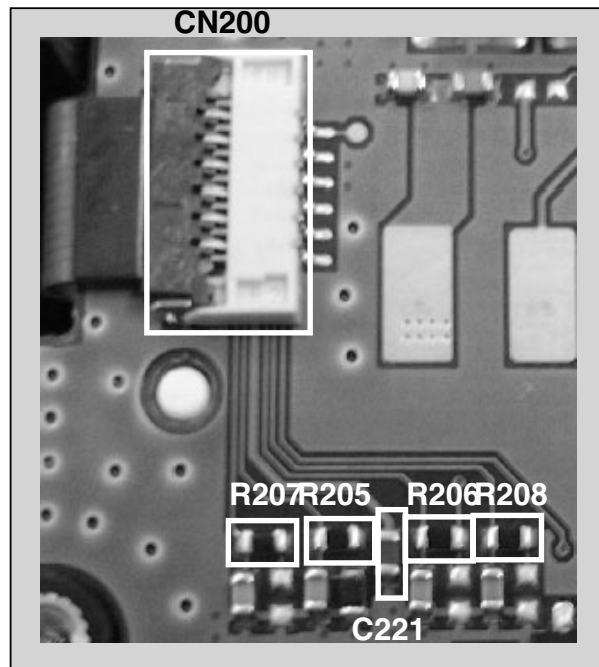




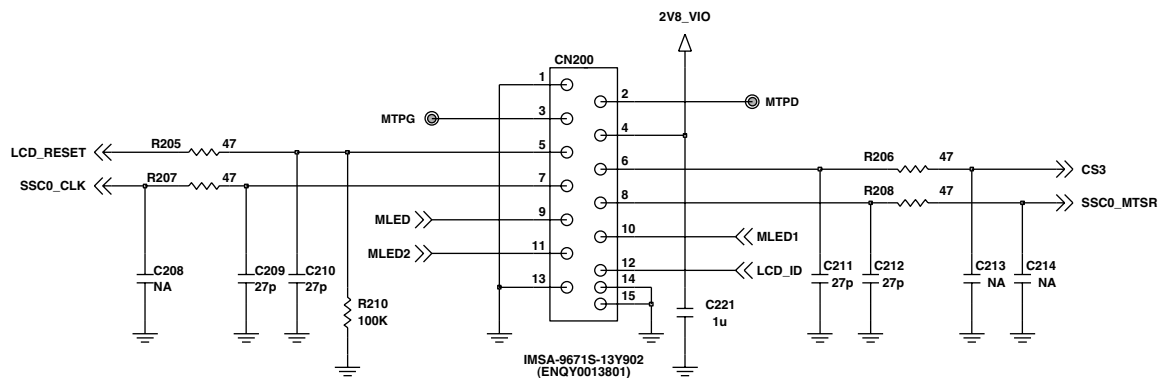
## 4. TROUBLE SHOOTING

### 4.9. LCD Trouble

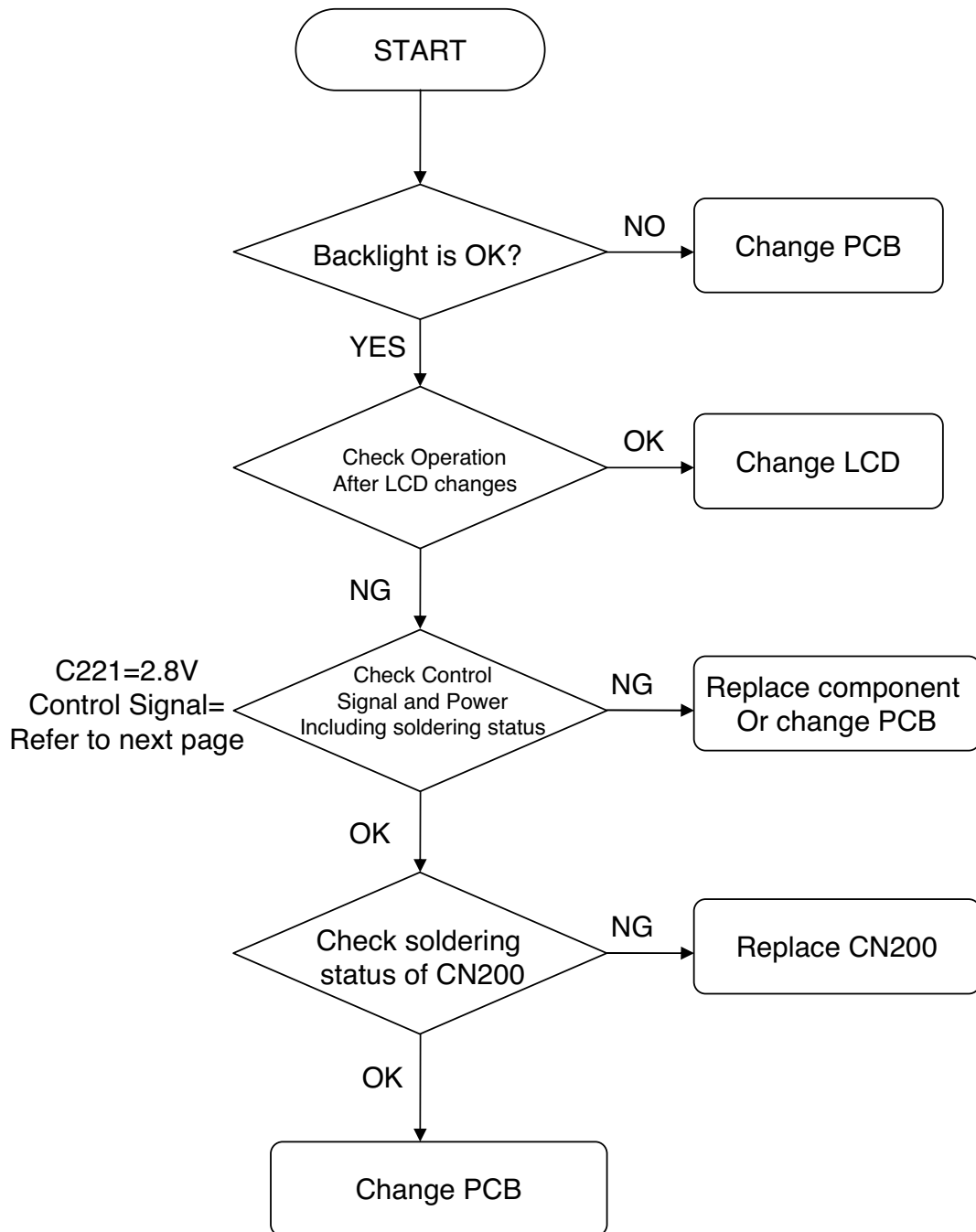
#### TEST POINT



#### CIRCUIT DIAGRAM

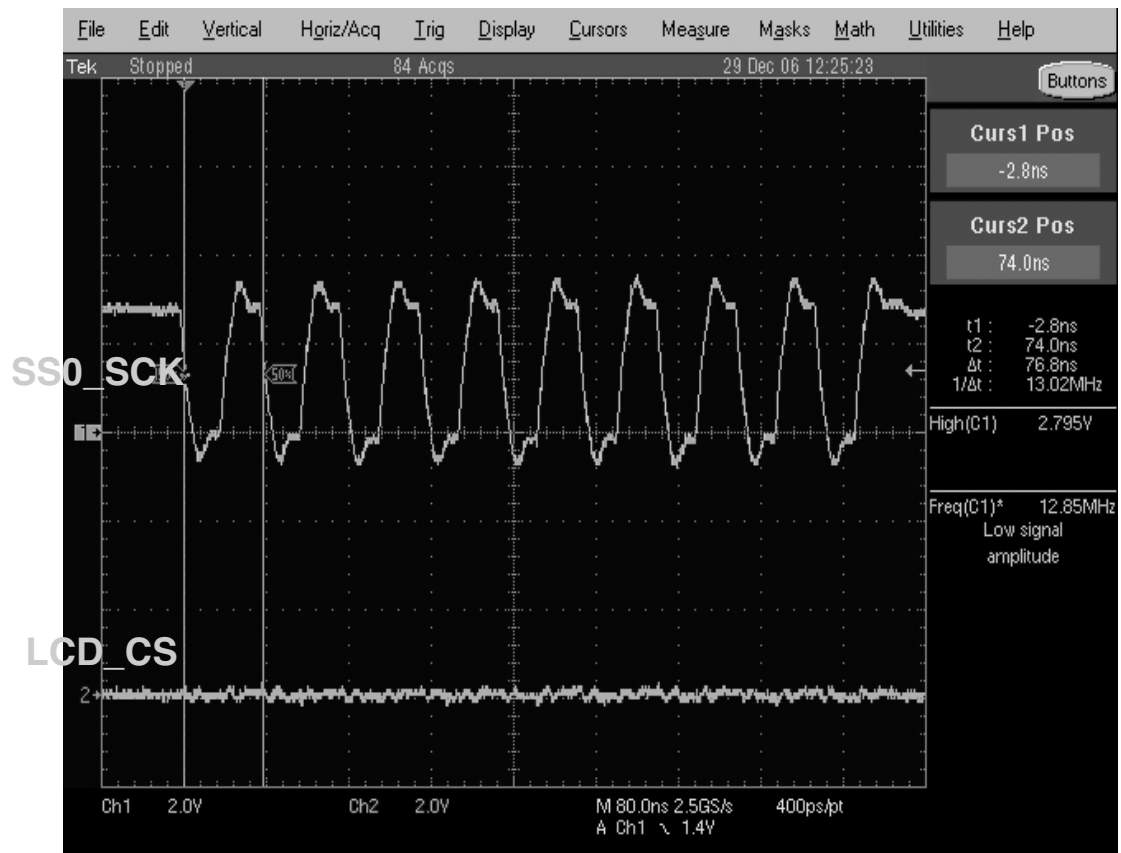


### Checking Flow



## 4. TROUBLE SHOOTING

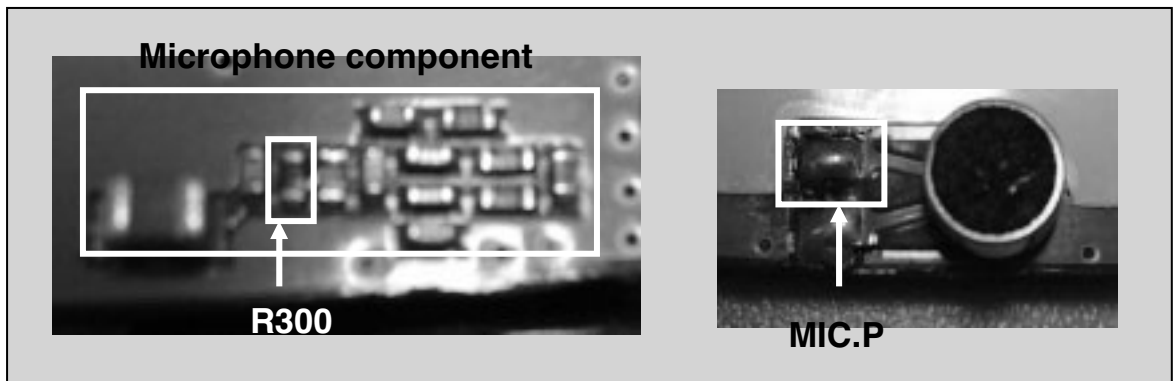
### WAVEFORM



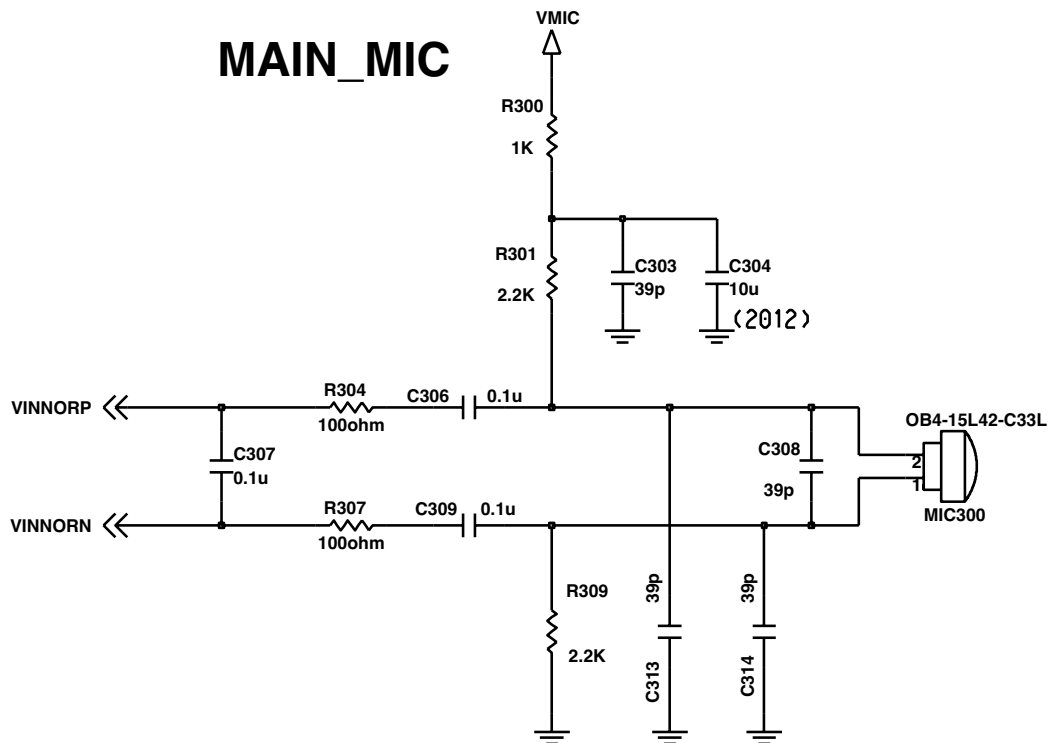
- SS0\_MTSR pattern is out randomly when clock is fluctuated.  
 , clock frequency is 13MHz and LCD\_RESET is High(2.8V).

### 4.10. Microphone Trouble

#### TEST POINT

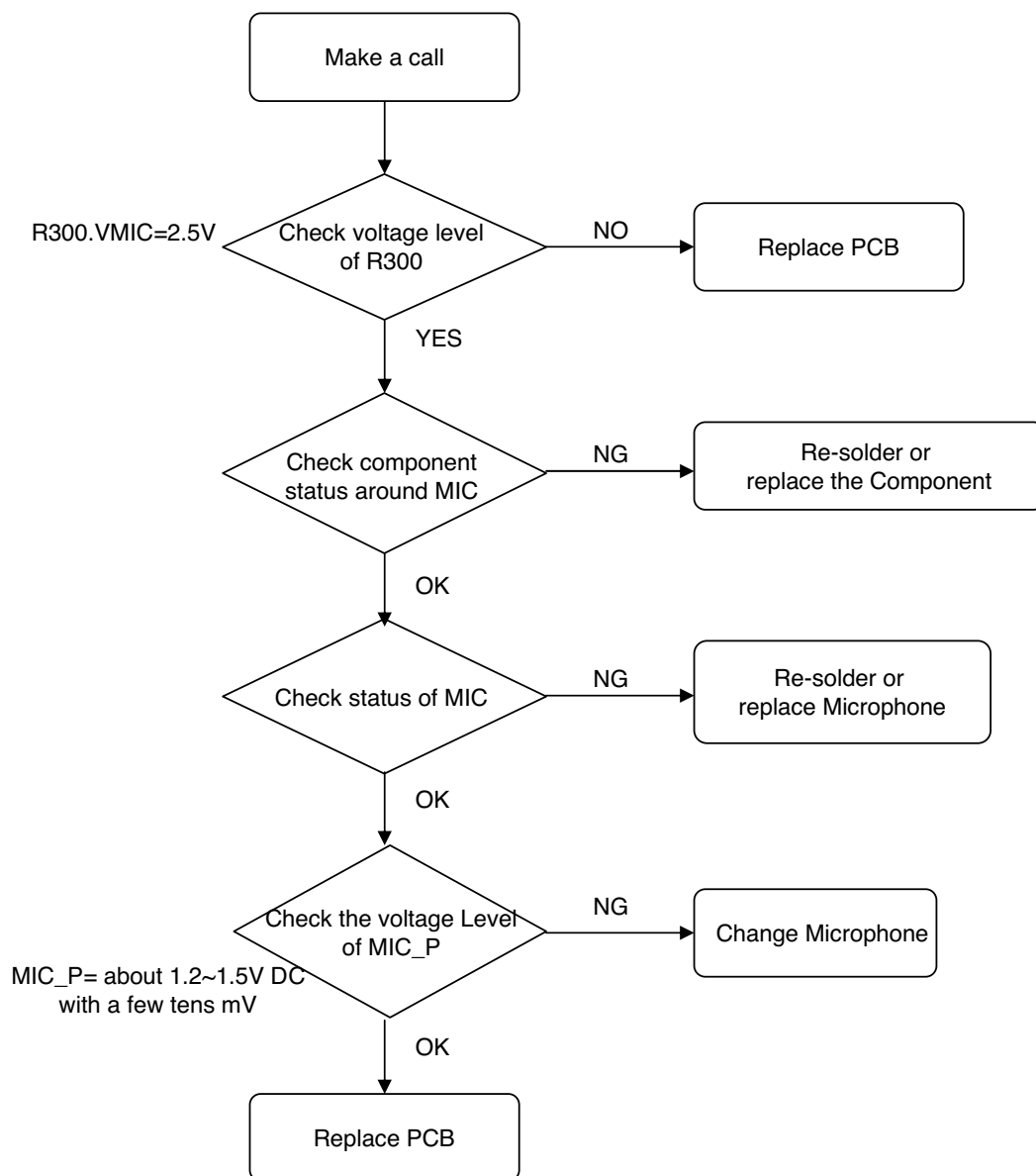


#### CIRCUIT DIAGRAM



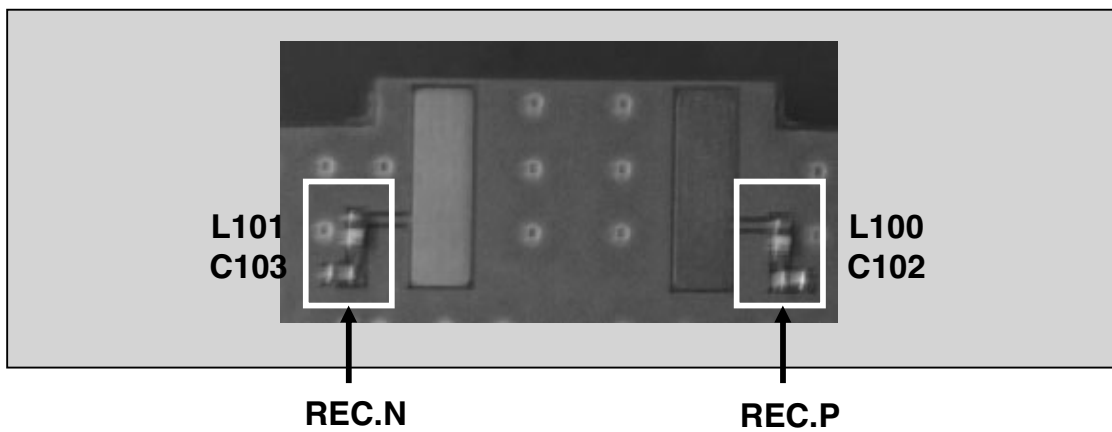
## 4. TROUBLE SHOOTING

### Checking Flow

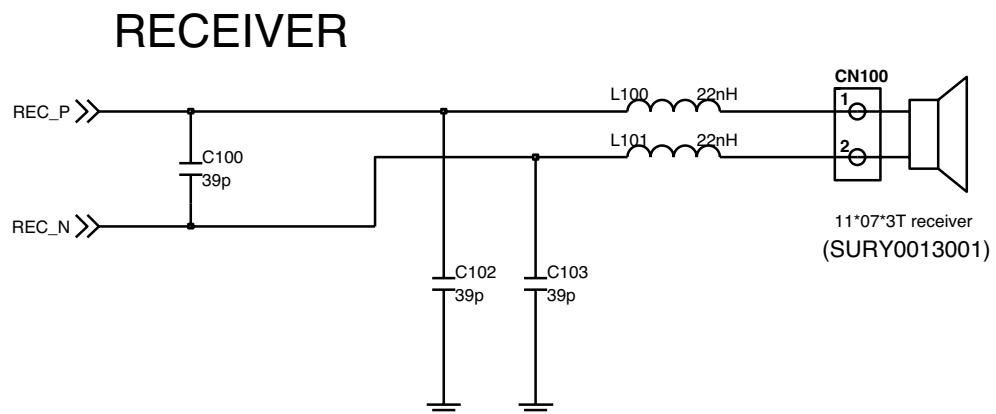


### 4.11. Receiver Trouble

#### TEST POINT

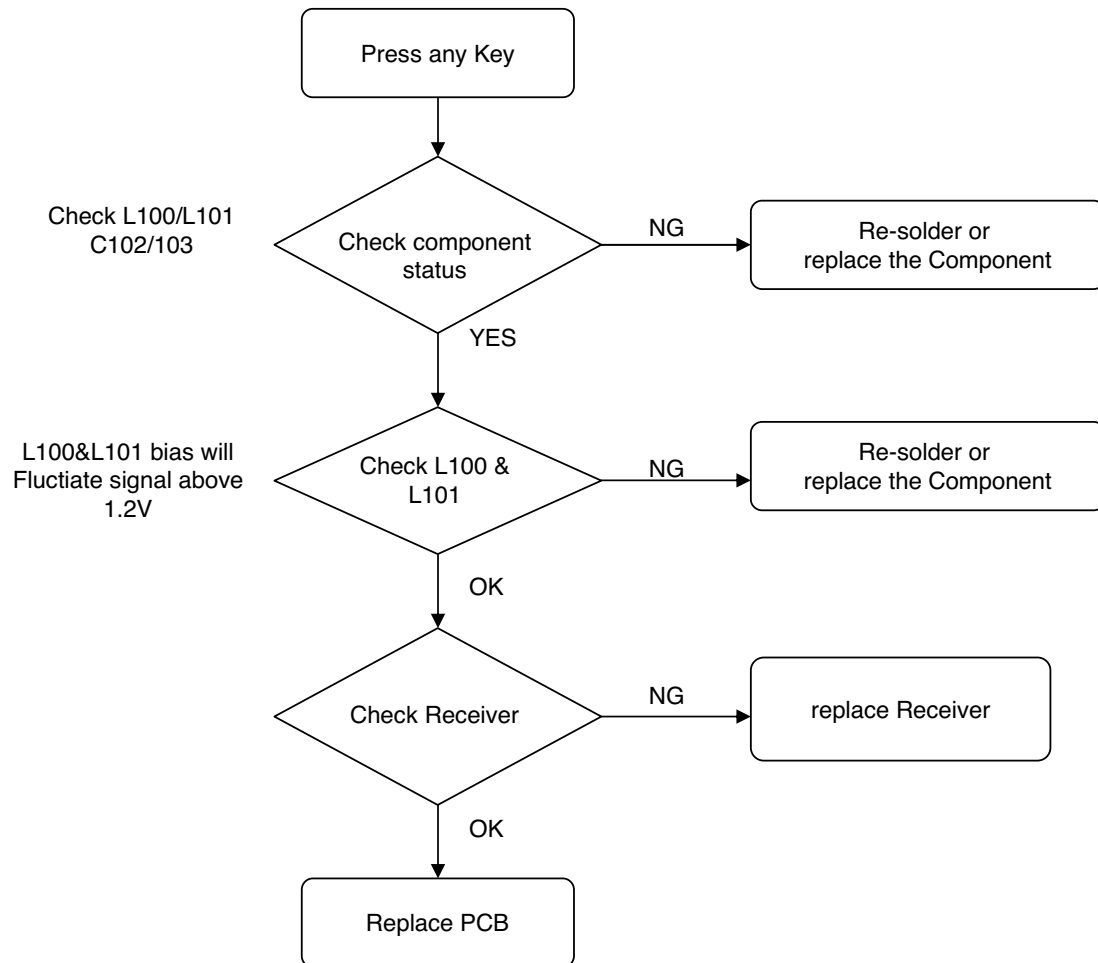


#### CIRCUIT DIAGRAM



## 4. TROUBLE SHOOTING

### Checking Flow

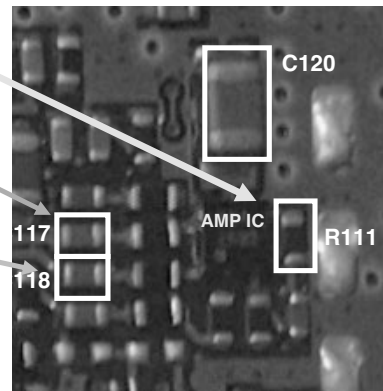
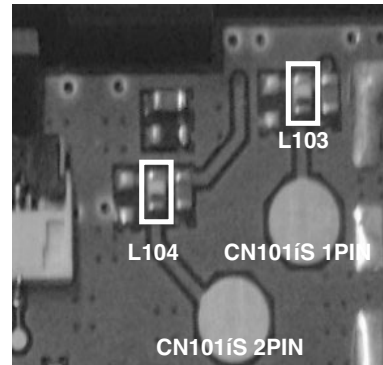
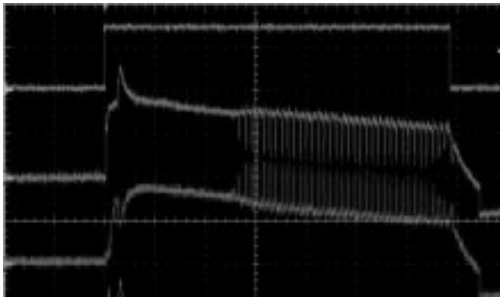


### 4.12 Speaker Trouble

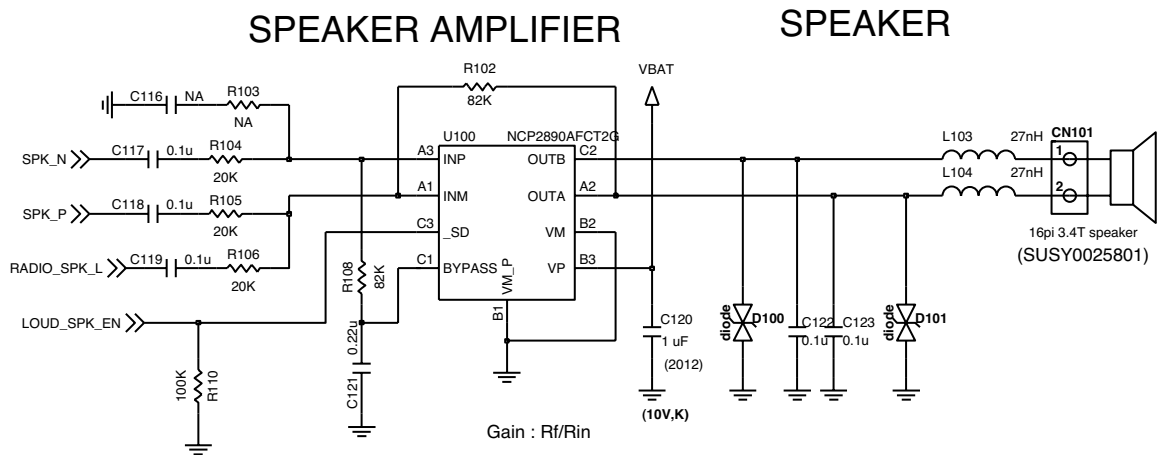
#### TEST POINT

#### Check Points

- Speaker spring contact
- Audio amp soldering



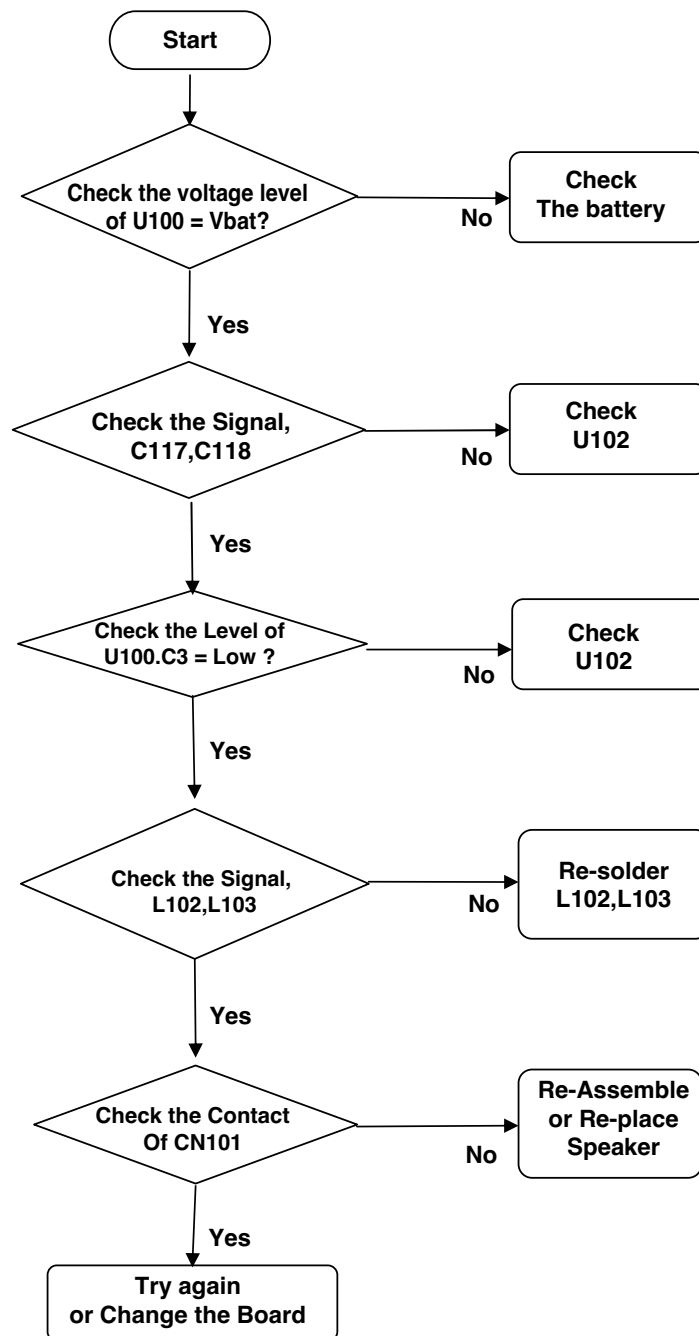
#### CIRCUIT





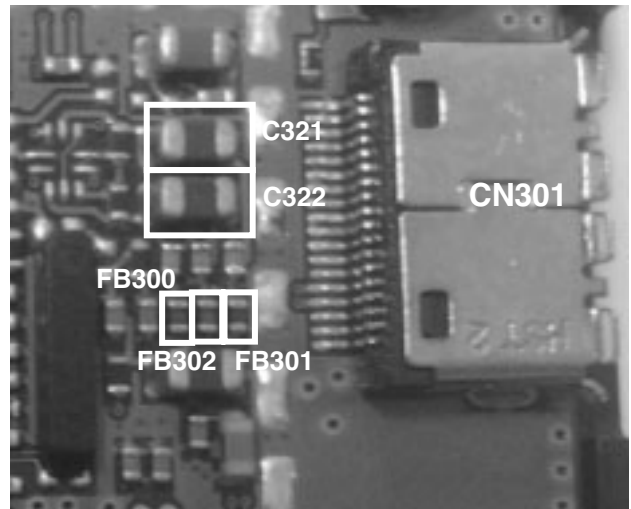
## 4. TROUBLE SHOOTING

### Checking Flow

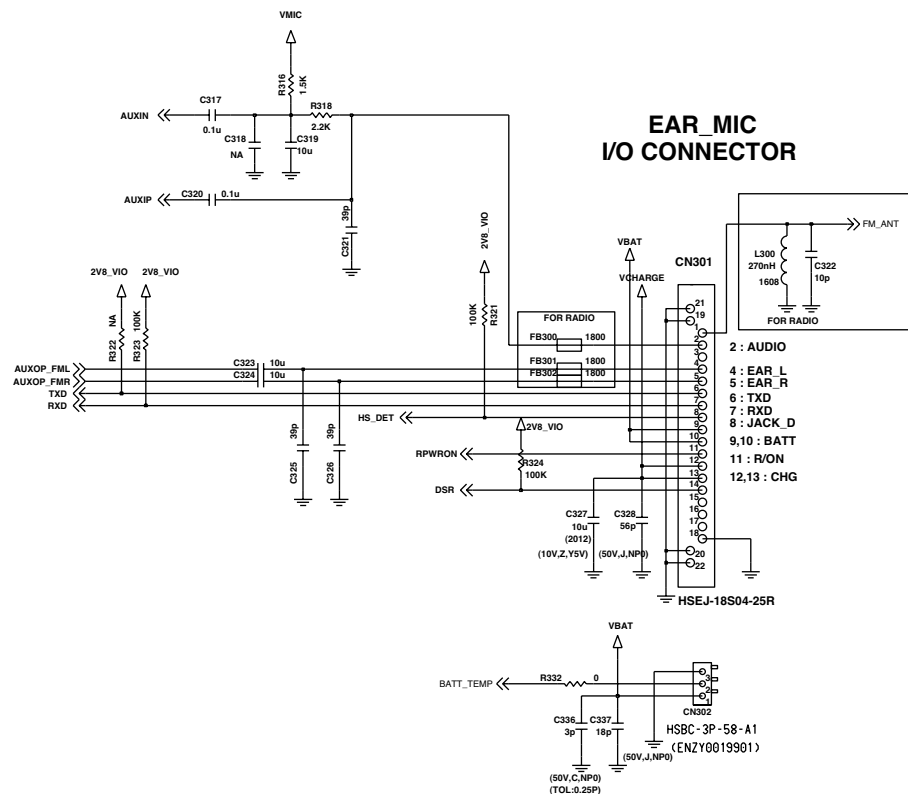


### TEST POINT

- 18pin IO connector
- Passive Parts soldering Status

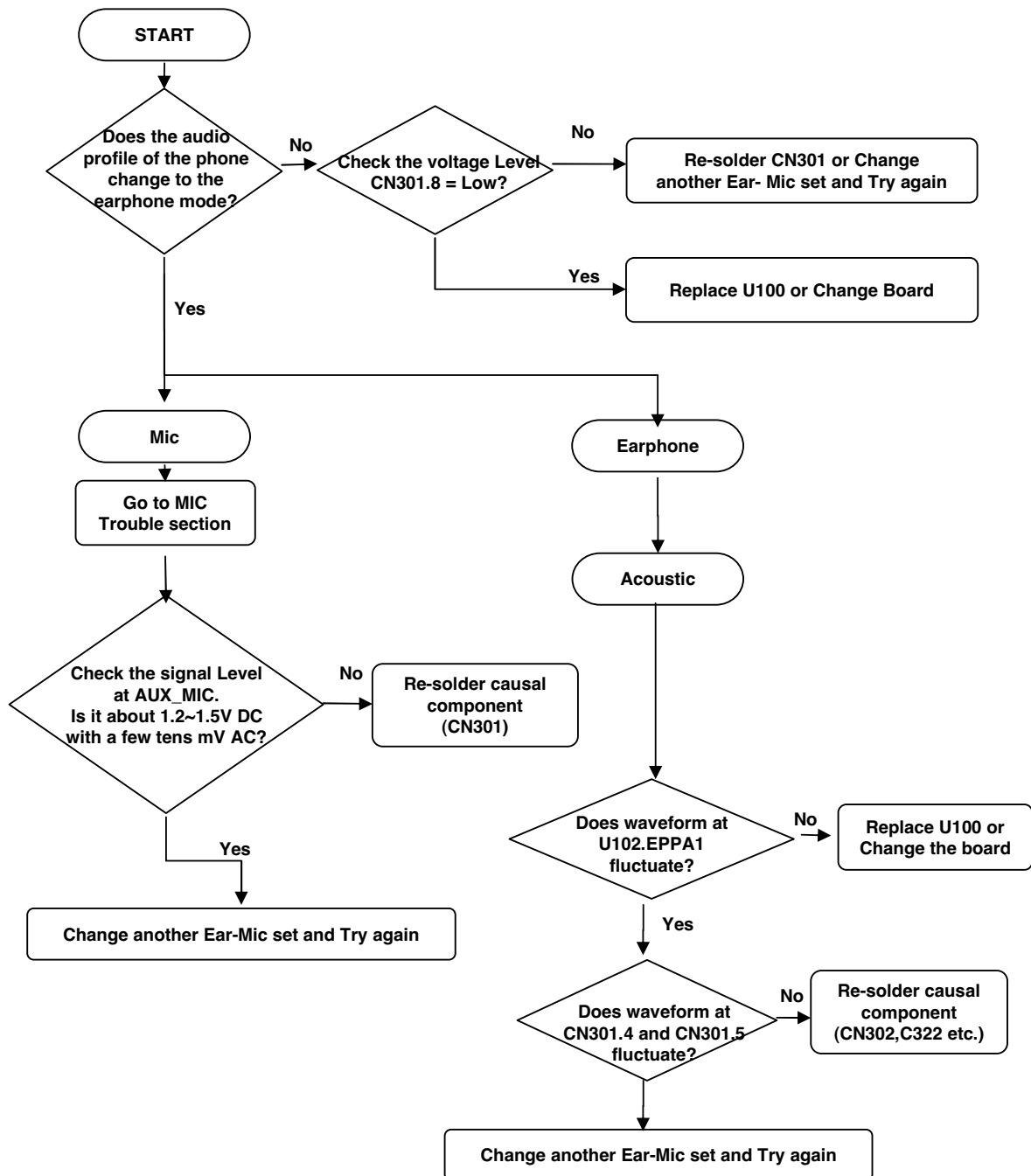


## CIRCUIT DIAGRAM



## 4. TROUBLE SHOOTING

### CHECKING FLOW

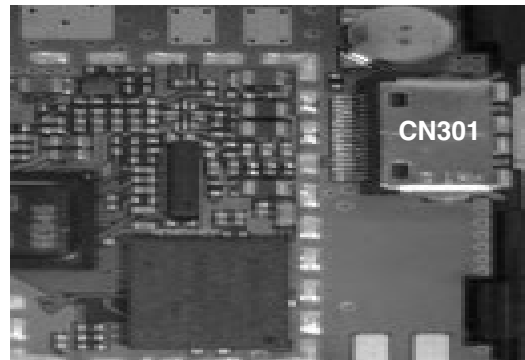
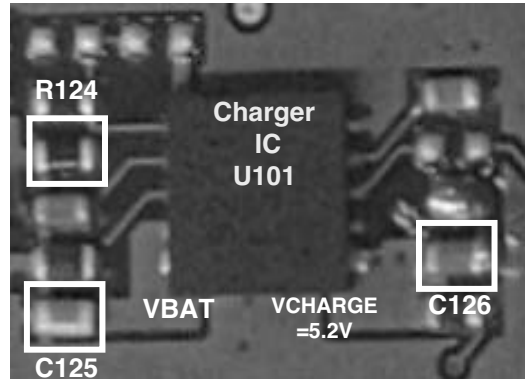


### 4.14 Charging Trouble

#### TEST POINT

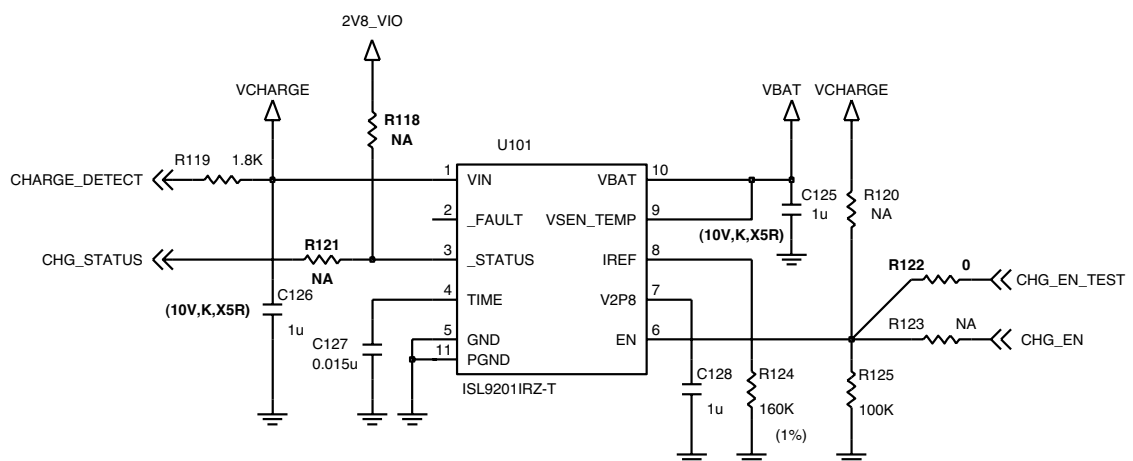
##### Check Points

- Connection of TA (check TA voltage 5.2V)
- Charging Current Path component voltage drop
- Battery voltage
- Charging IC



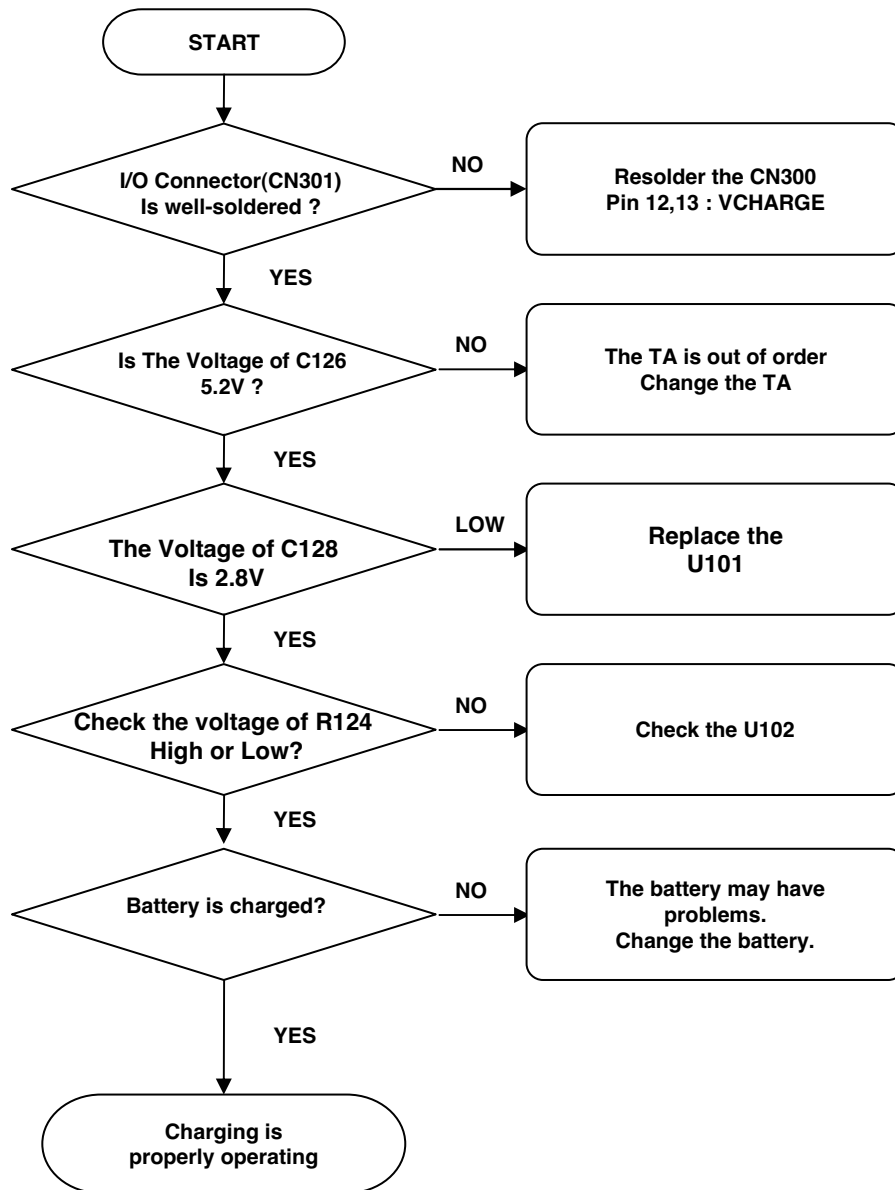
#### CIRCUIT

### CHARGING IC



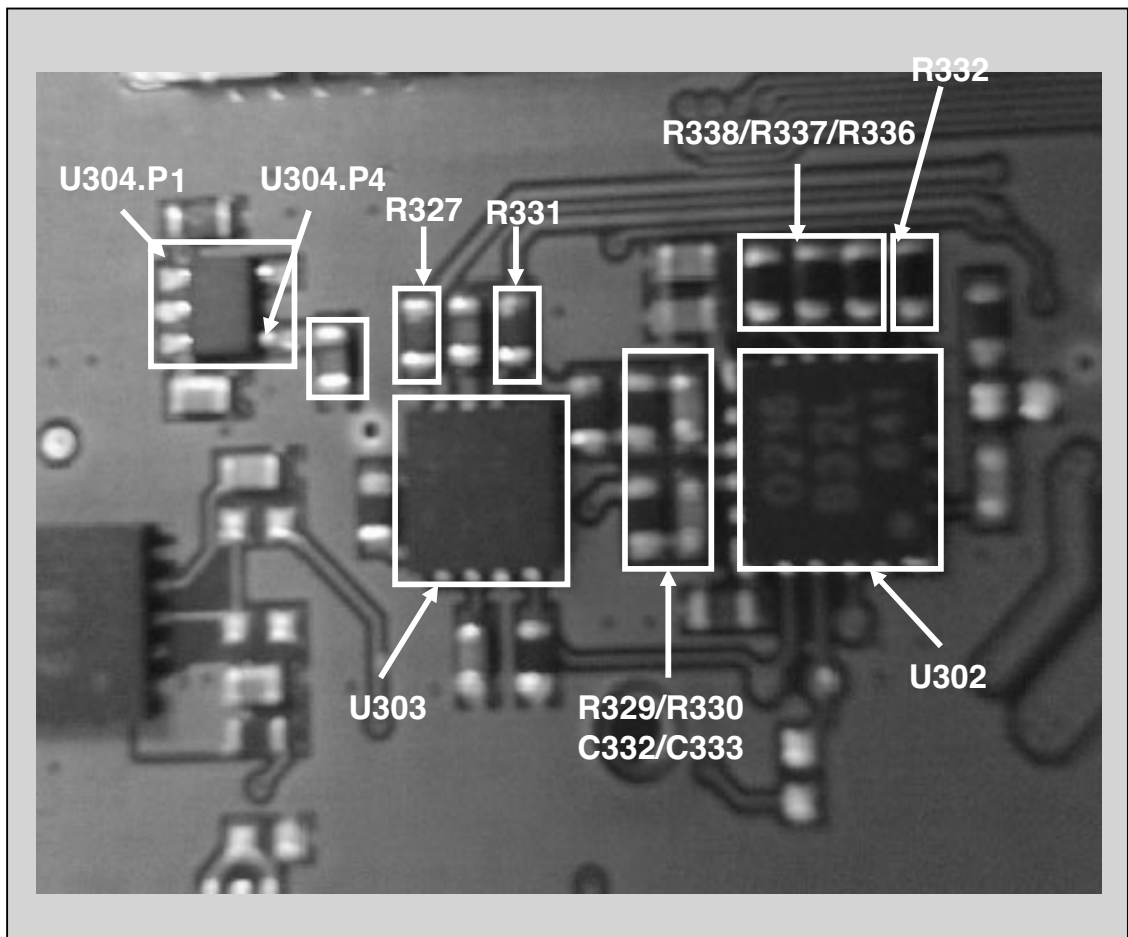
## 4. TROUBLE SHOOTING

### Checking Flow



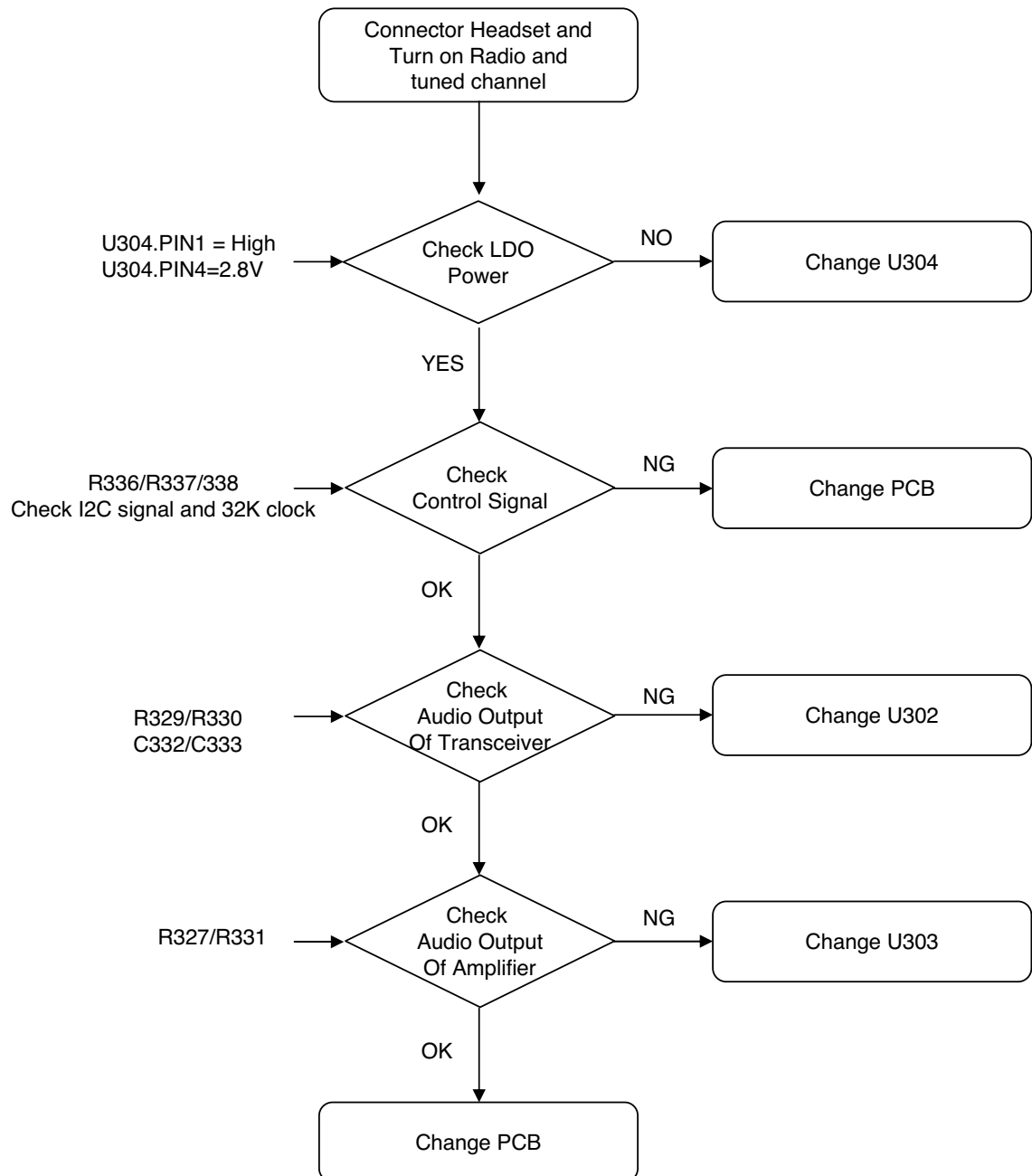
### 4.15. FM Radio Trouble

#### TEST POINT





### Checking Flow





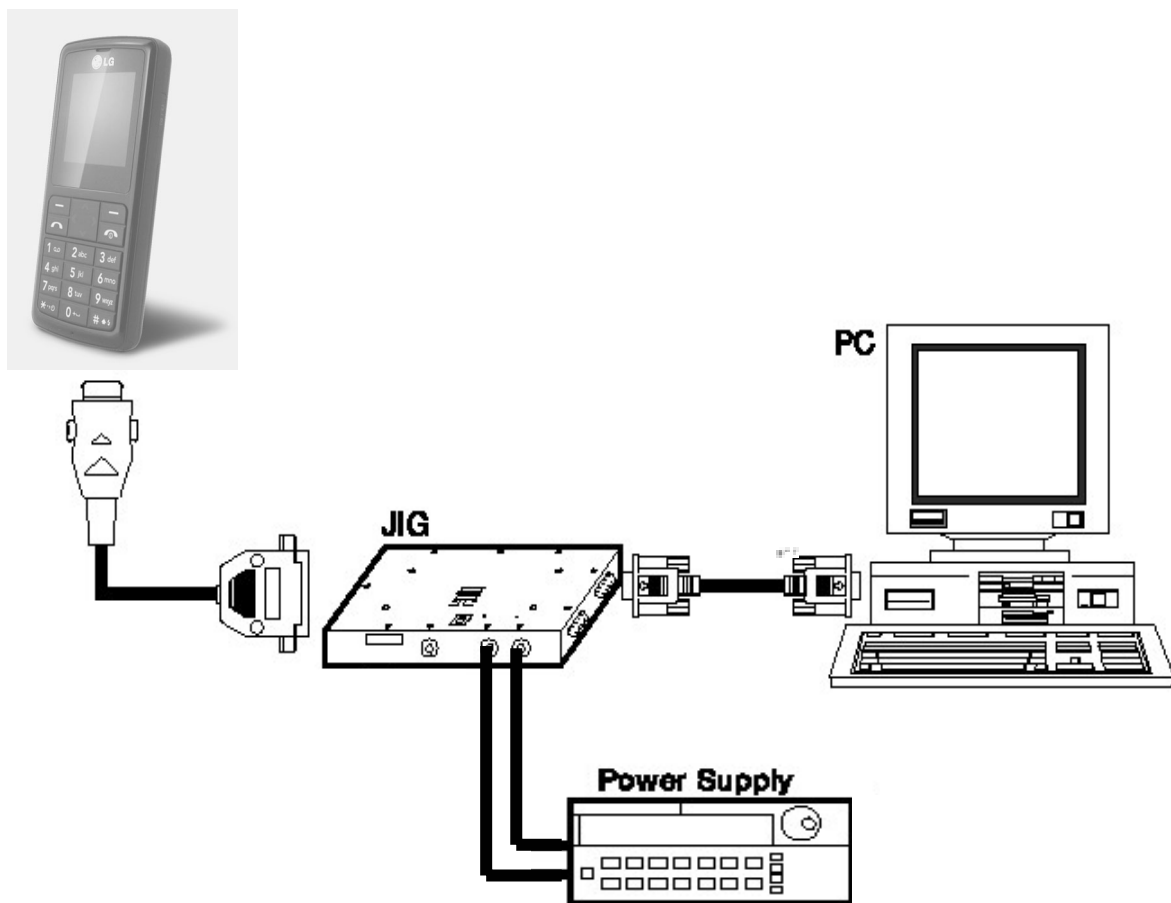
## 5. DOWNLOAD

---

## 5. DOWNLOAD

### 5.1 Download Setup

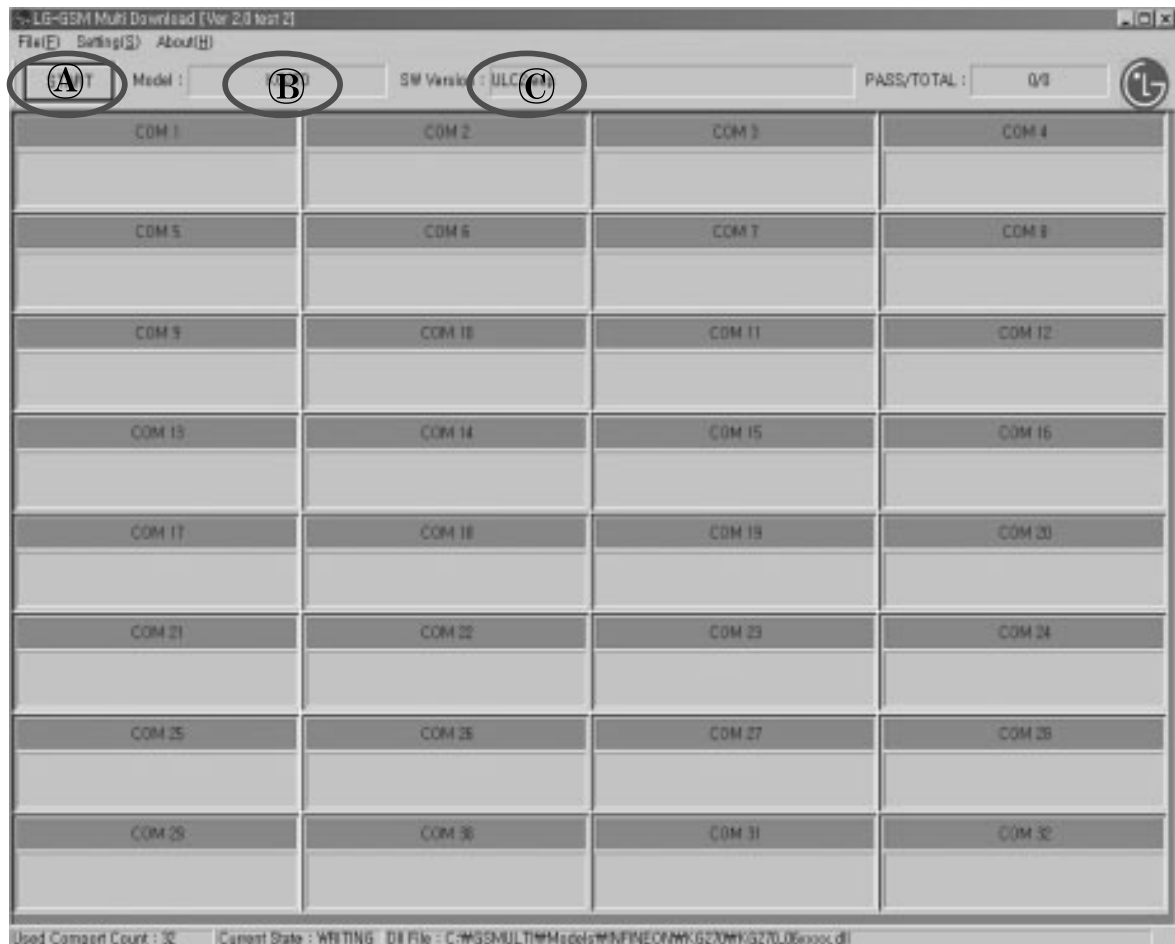
Configure system like figure 5-1.



**Figure 9-1. Download Setup**

### 5.2 Download Process

#### 5.2.1. Download step[1]



Ⓐ : Start or Stop download

Ⓑ : Selected configuration DLL file

Ⓒ : File name downloading

File(F) → Exit(X) : End program

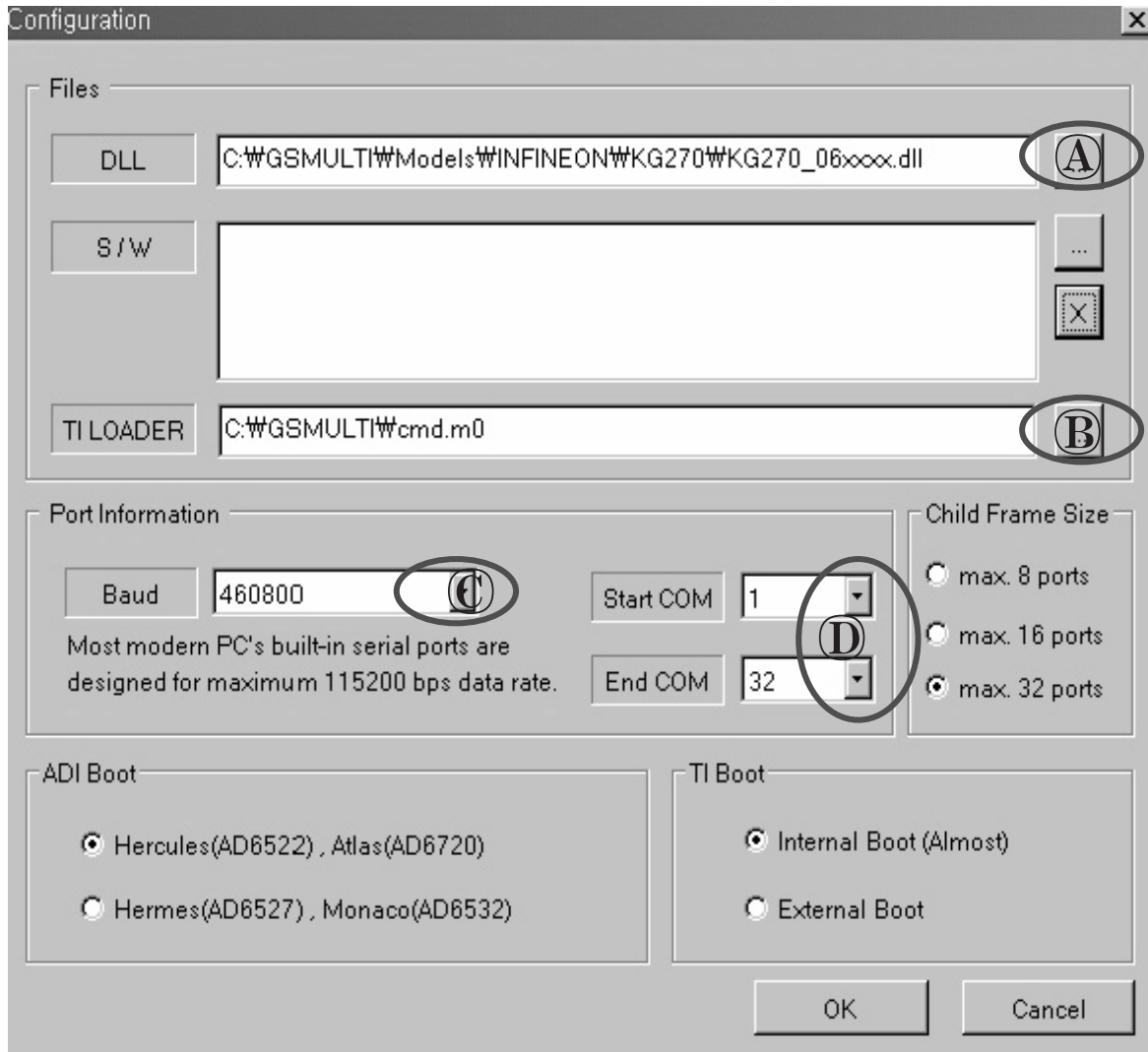
Setting(S) → Configuration : configuration download condition DLL, SW files and etc.

About(H) → MultiGSM : Provide version information

First, select Setting Menu.

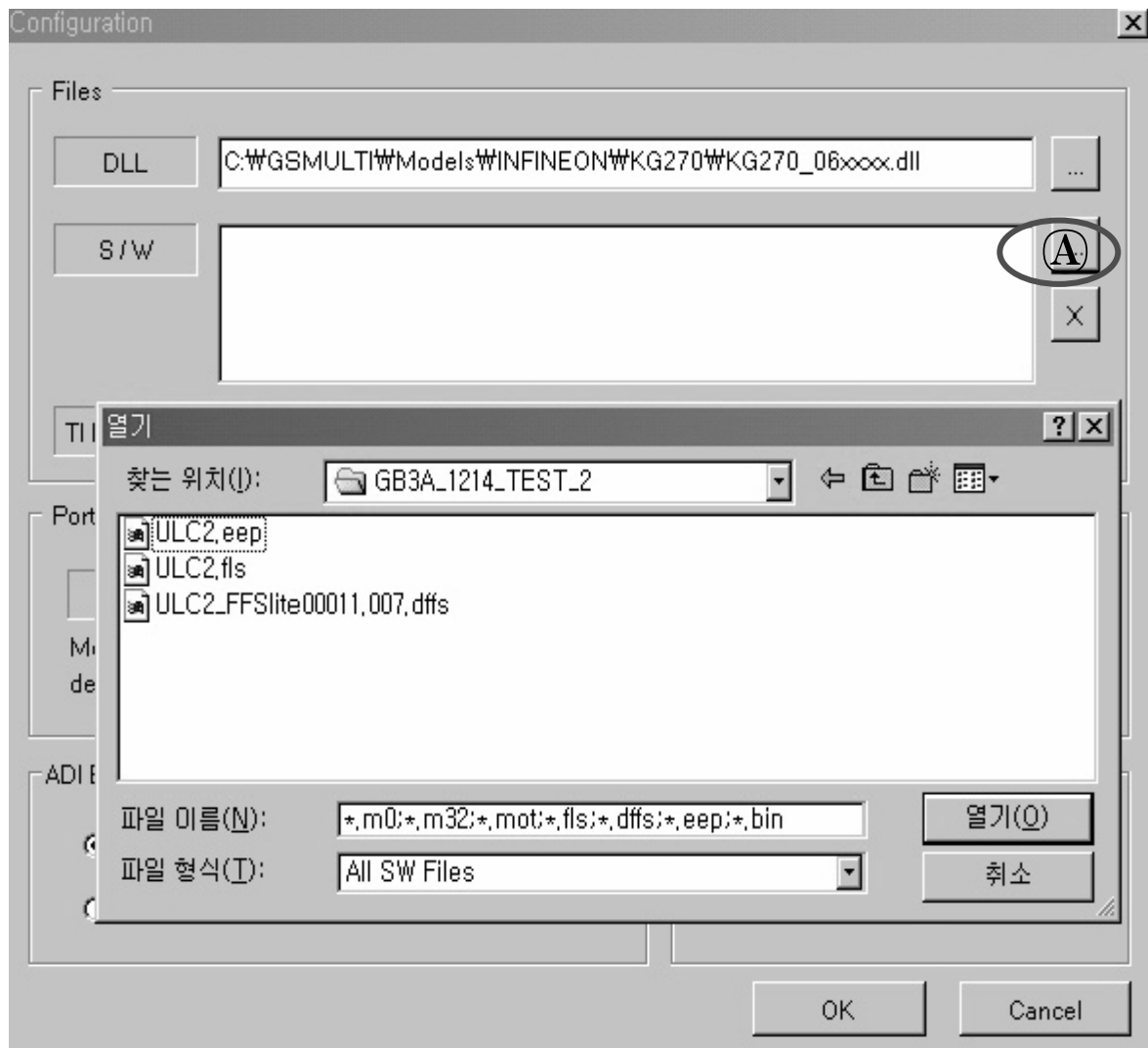
## 5. DOWNLOAD

### 5.2.2. Download step[2]



- Ⓐ : Select a appropriated DLL file  
- You must select KG270\_xxxxxx.DLL file.
- Ⓑ : Select configuration file  
You must select cmd.m0 file
- Ⓒ : Select download speed  
You must 460800. System supports maximum 460800bps.
- Ⓓ : Select port  
select start and end port be operated

### 5.2.3. Download step[3]



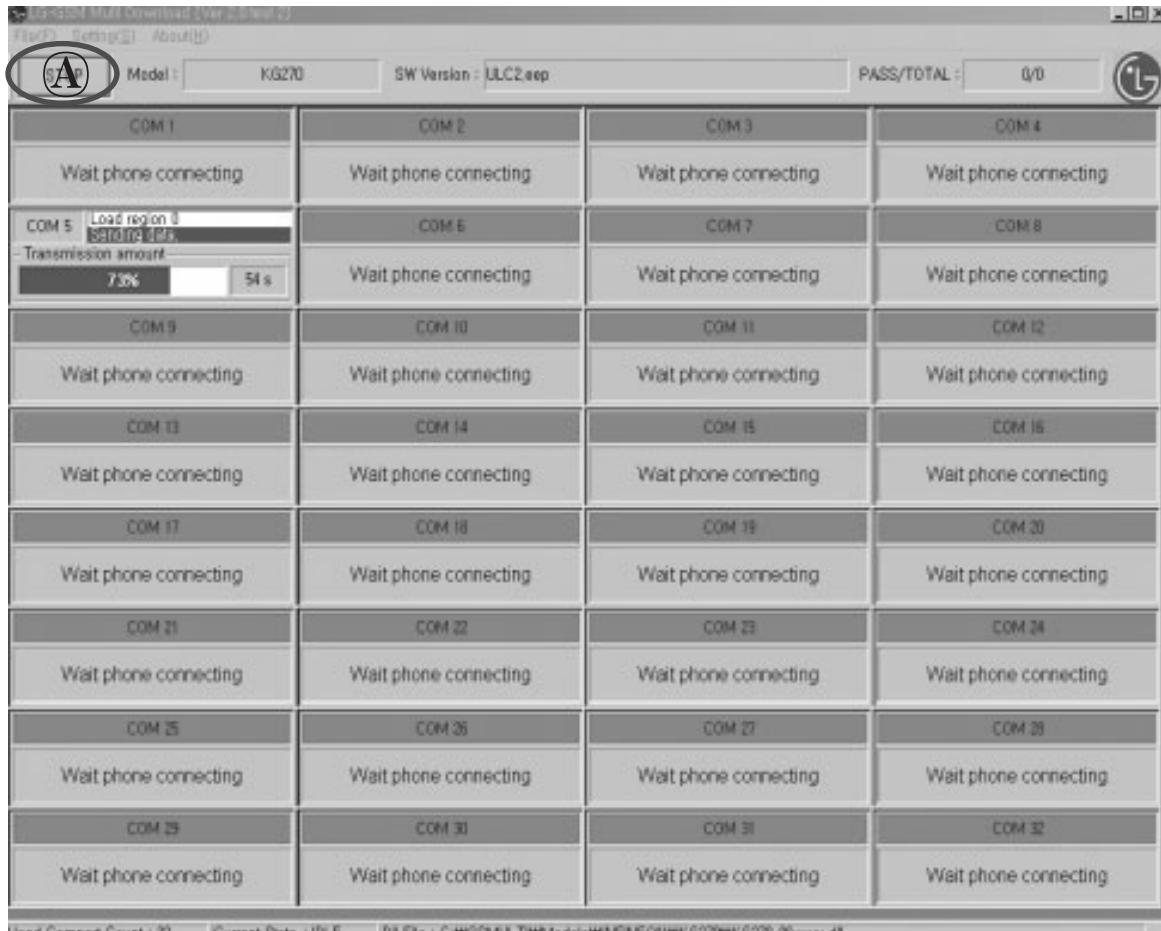
Ⓐ : Select files downloaded

KG270 have 4 files, \*.eep, \*.flc, \*.dffs and \*.cust.

But You must not select \*.eep file.

## 5. DOWNLOAD

### 5.2.4. Download step[4]



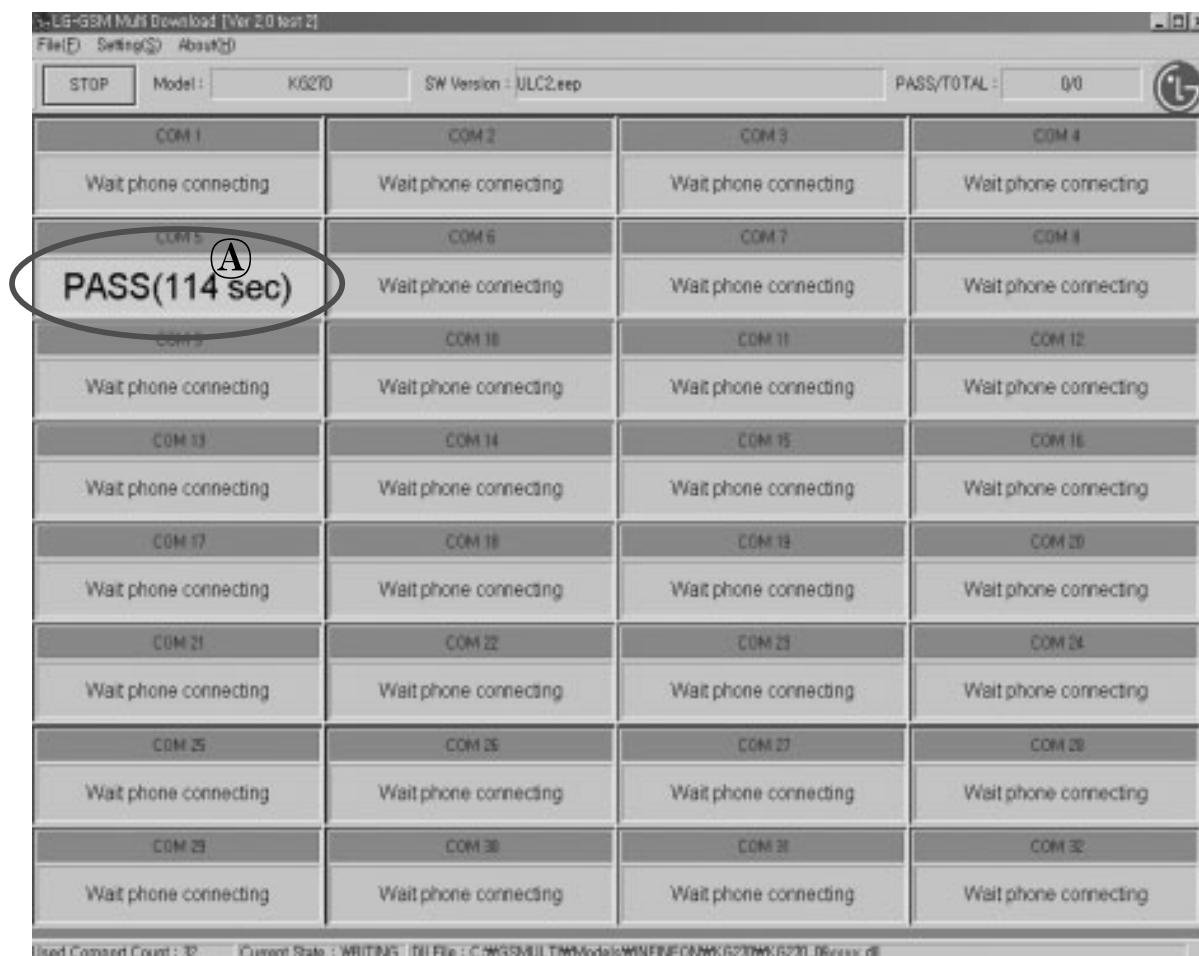
Ⓐ : Start download and stop download next step.

If configuration is finished, then push start button and then button is changed to STOP.

Turn on power of multi download and connector phones.

If download is started, then push start button else program will download repeatedly.

### 5.2.5. Download step[5]

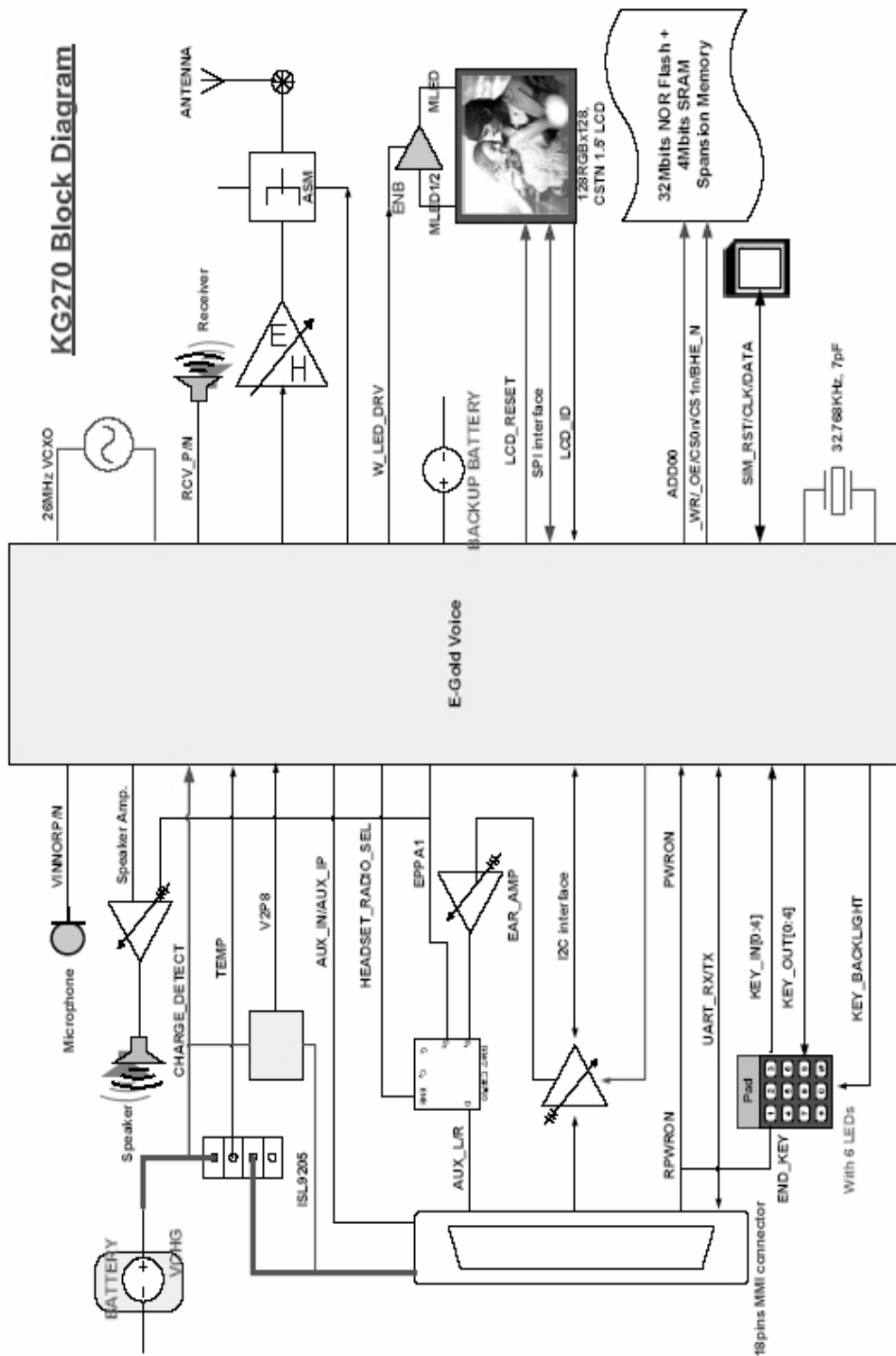


Ⓐ : This region appears donwload status.

If download is finished, PASS or FAIL.message is showed.

## 6. BLOCK DIAGRAM

## 6. BLOCK DIAGRAM

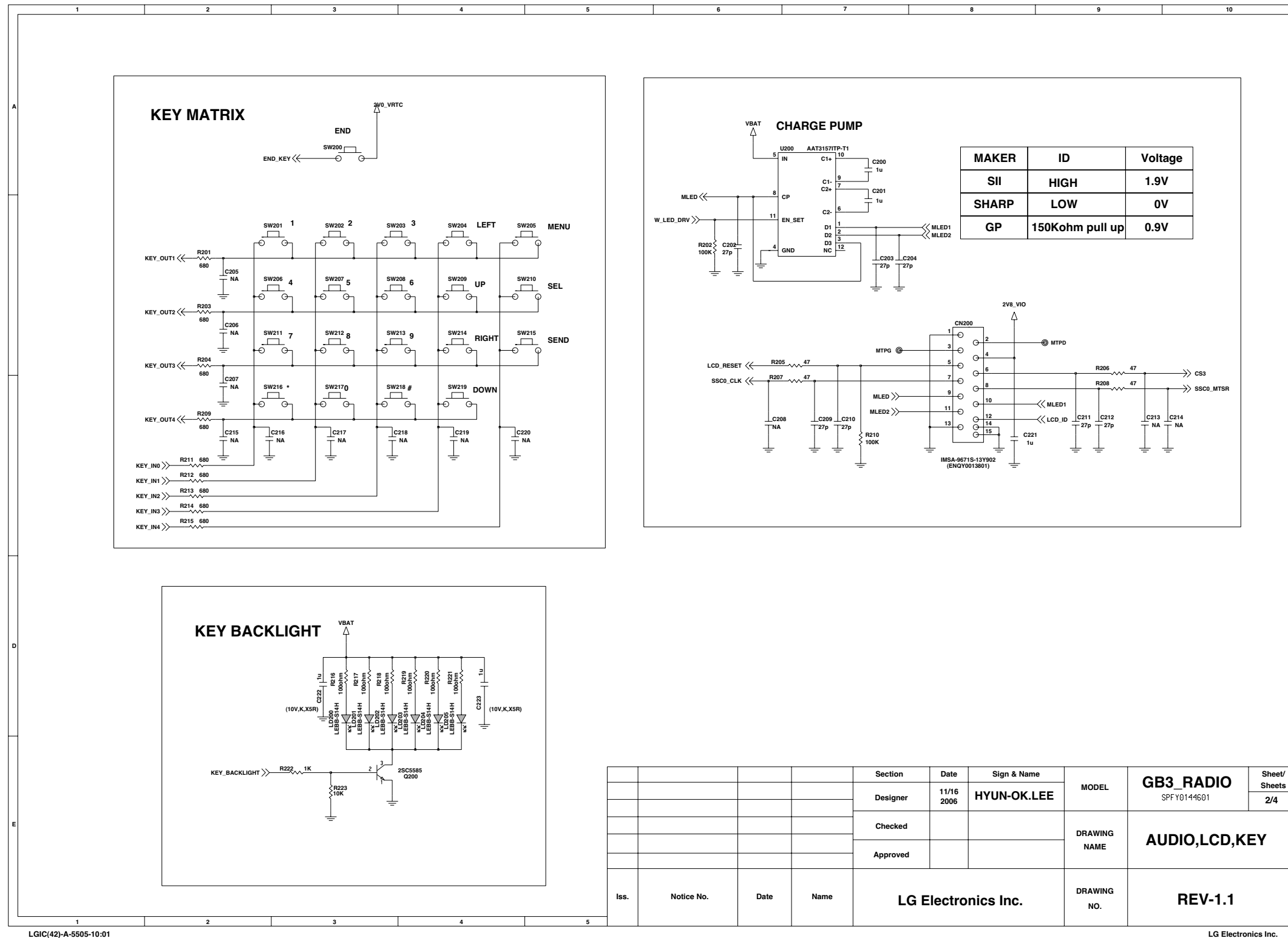


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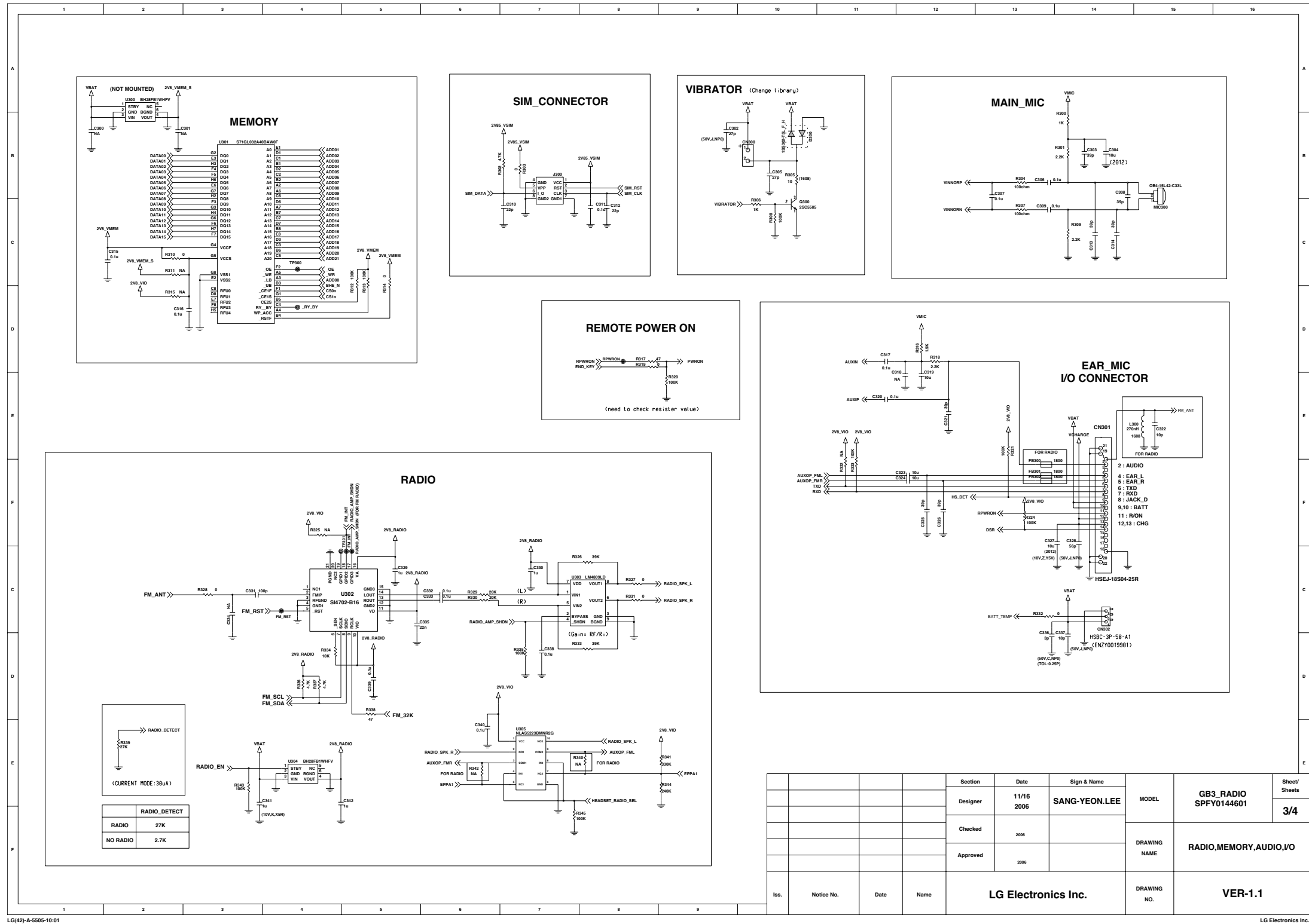




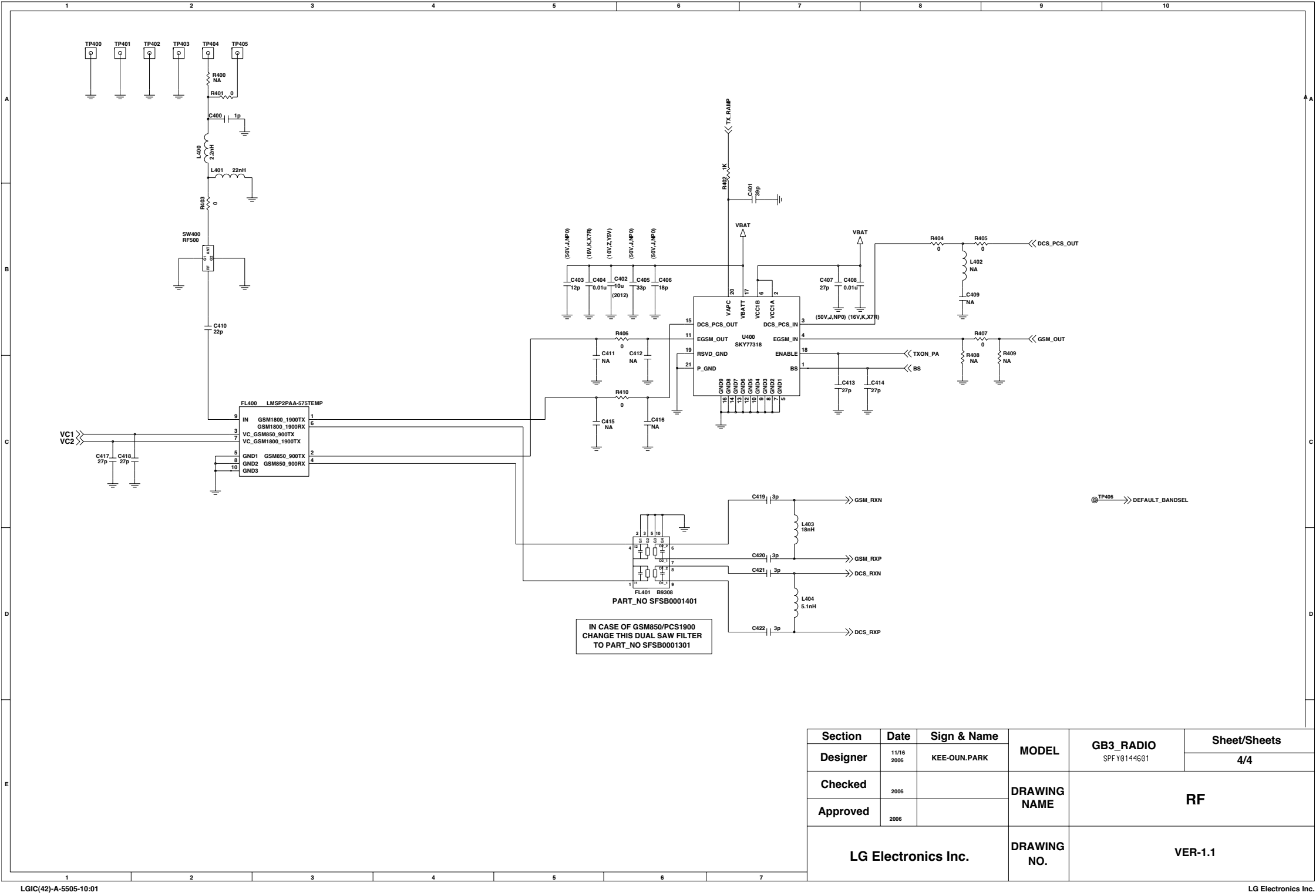
## 7. CIRCUIT DIAGRAM



## 7. CIRCUIT DIAGRAM



7. CIRCUIT DIAGRAM

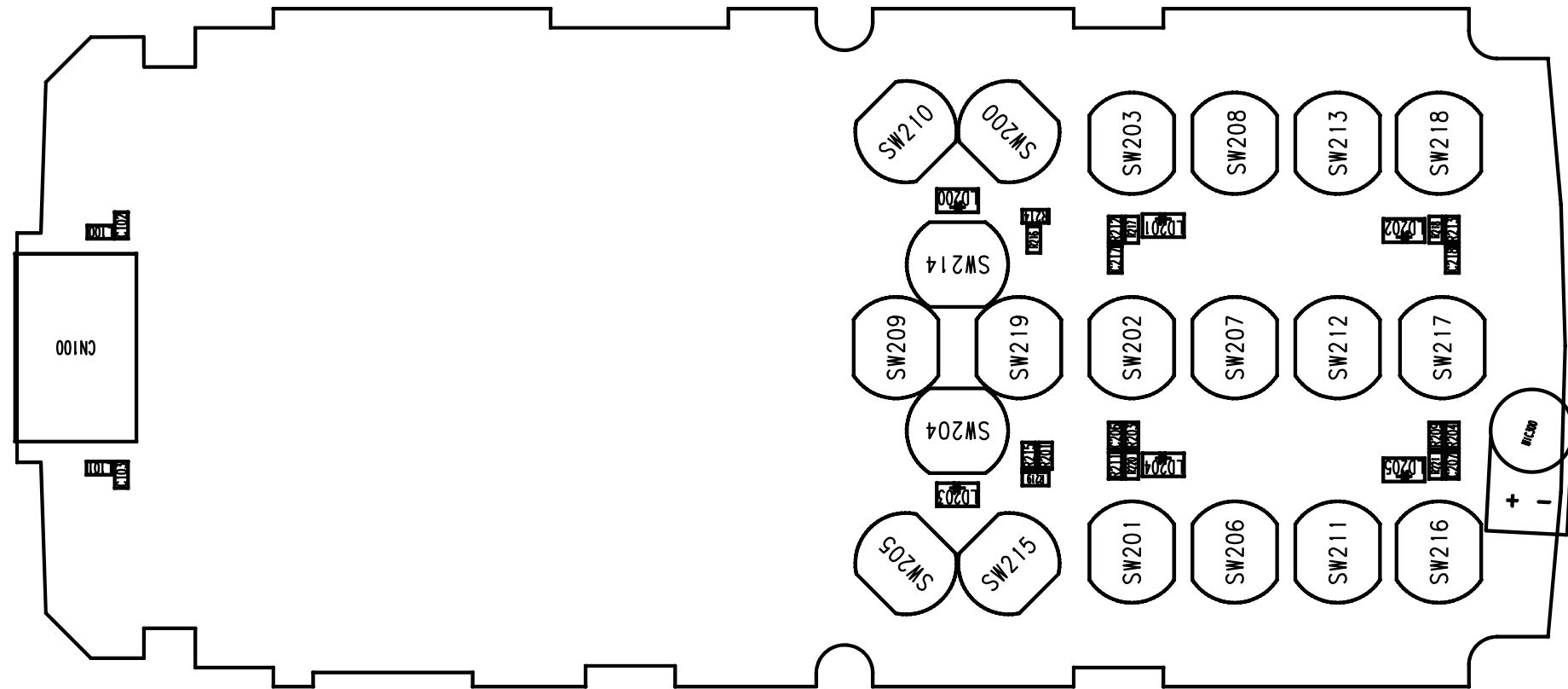


Section	Date	Sign & Name	MODEL	GB3_RADIO SPFY0144601	Sheet/Sheets
Designer	11/16 2006	KEE-OUN.PARK			4/4
Checked	2006		DRAWING NAME	RF	
Approved	2006				
LG Electronics Inc.			DRAWING NO.	VER-1.1	

LGIC(42)-A-5505-10:01

LG Electronics Inc.

8. PCB LAYOUT



KG270-MAIN-SPFY0144601-1.1-TOP

LGE Internal Use Only



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## 9. ENGINEERING MODE

### 9.1 About Engineering Mode

Engineering mode is designed to allow a service man/engineer to view and test the basic functions provided by a handset.

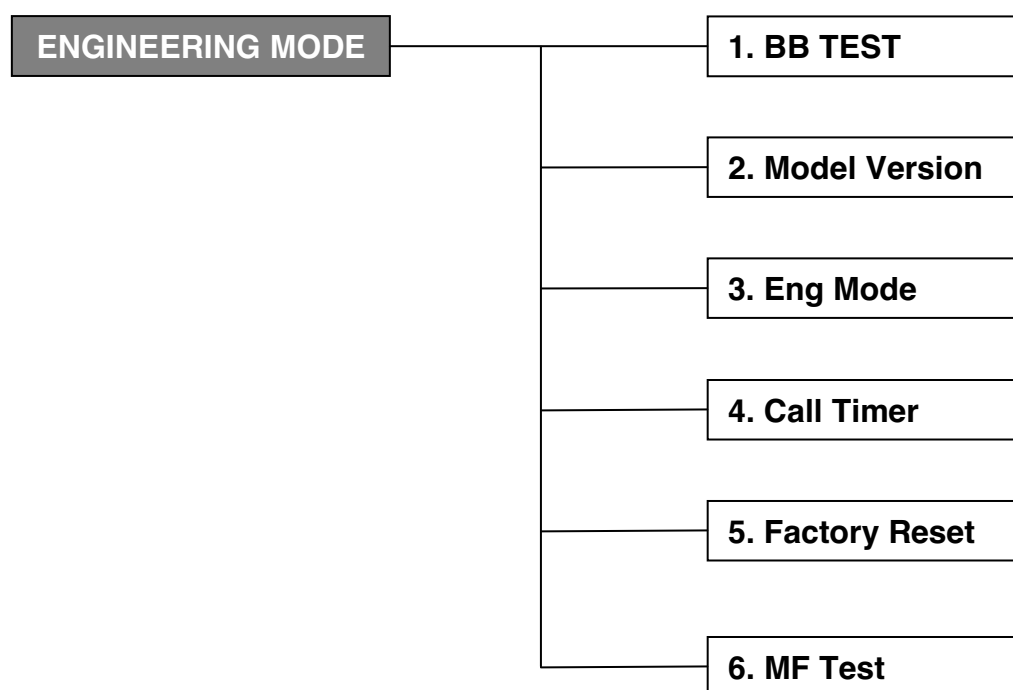
### 9.2 Access Codes

The key sequence for switching the engineering mode on is 2945##. Pressing END will switch back to non-engineering mode operation.

### 9.3 Key Operation

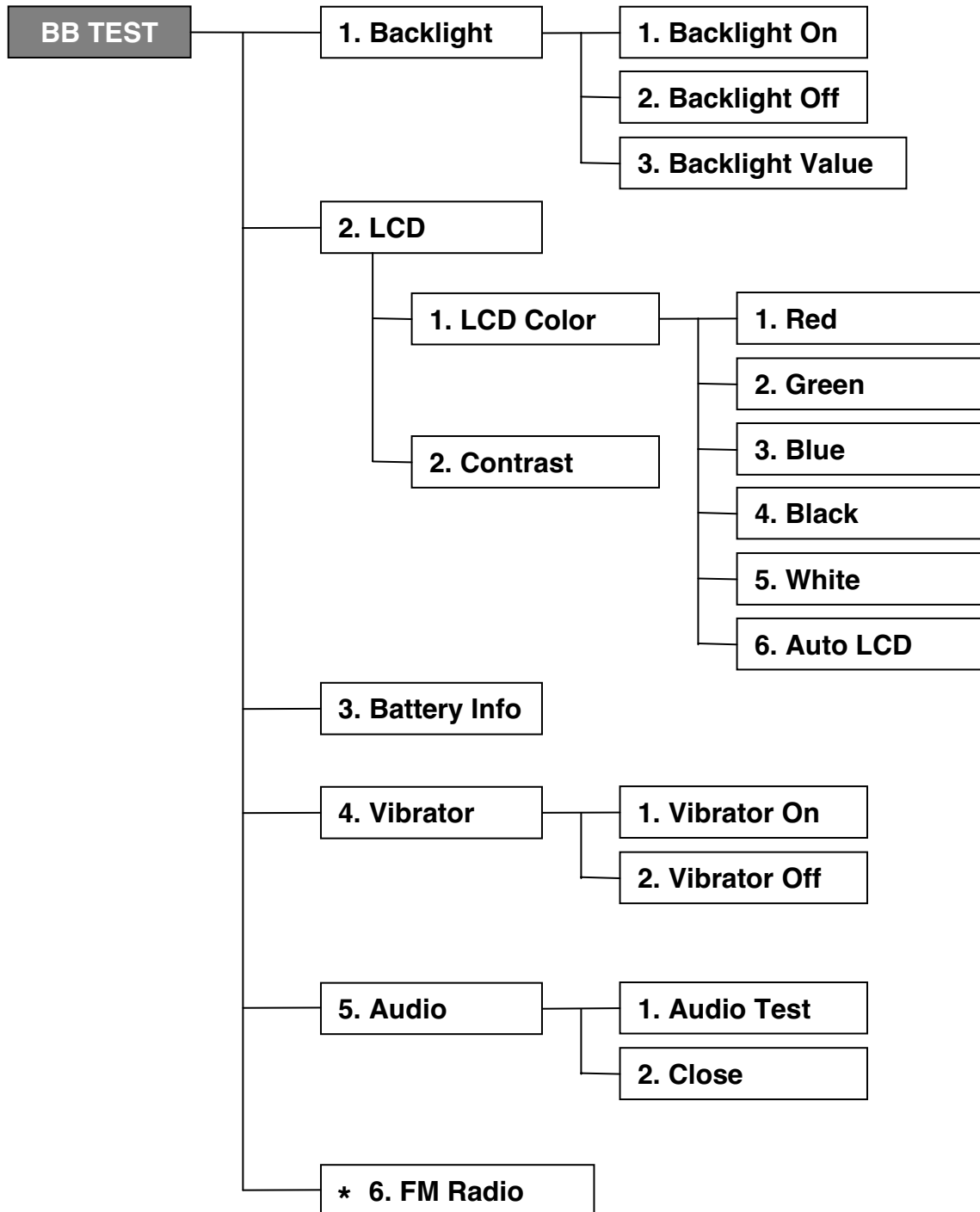
Use Up and Down key to select a menu and press 'select' key to progress the test. Pressing 'back' key will switch back to the original test menu.

### 9.4 Engineering Mode Menu Tree



## 9. ENGINEERING MODE

---



**\* FM Radio function is not supported**

### 9.4.1 BB Test

#### 9.4.1.1 Backlight

- ① backlight on : LCD backlight is off.
- ② backlight off : LCD backlight is on.
- ③ backlight value : LCD backlight brightness is controlled by 20% from 100 to 0.

#### 9.4.1.2 LCD

- ① LCD color : This menu includes 5 color menu and automatic color change.  
5 color menu is Red, Green, Blue, Black and White.
- ② LCD contrast : This menu displays a contrast value and LCD maker.

#### 9.4.1.3 Battery Info

This menu displays the information of battery, as example battery voltage level and temperature.  
In line 2, battery voltage level is displayed with average and instant value.  
In line 3, battery temperature value is displayed, but this value is ADC value.  
In line 4, Icon number of battery voltage is displayed.

#### 9.4.1.4 Vibrator

This menu can control vibrator on and off operation.

#### 9.4.1.5 Audio

This menu can control MIDI operation



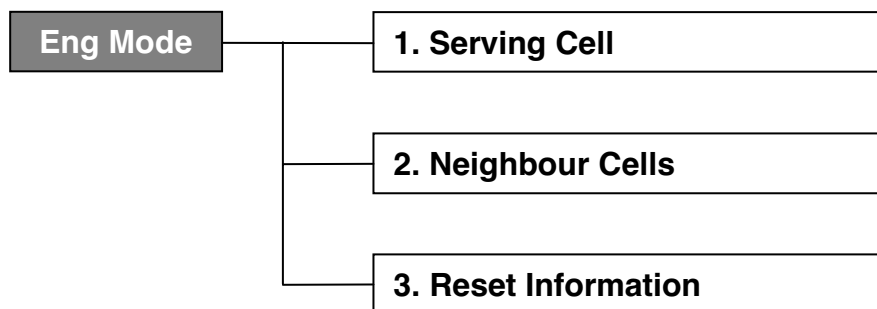
## 9. ENGINEERING MODE

---

### Model Version

#### 9.4.2 Model Version

This menu displays the Model software version.



### 9.4.3 Eng Mode

#### 9.4.3.1 Serving Cell

This Menu displays the the informations of Serving Cell environment.

For example, ARFCN, RF Level etc.

ARFCN : Absolut Radio Frequency Channel Number (Frequency Number) of Serving Cell while Idle mode

RxLev : RX level of Serving Cell while Idle mode

C1 : C1 Value of Serving Cell, This value will be used to decide cell reselection.

C2 : C2 Value of Serving Cell, This value will be used to decide cell reselection.

BPM : Paging period of Serving Cell

ARFCND : Absolut Radio Frequency Channel Number (Frequency Number) of Serving Cell while Dedicated mode

RxLf : Full RX level of Serving Cell

RxLs : Sub RX level of Serving Cell

RxQf : Full RX qual of Serving Cell

RxQs : Sub RX qual of Serving Cell

DSC : Downlink Signal Counter

RLL : Radio Link Loss Counter

Chtyp : Channel type of Serving Cell

Chmod : Channel Mode of Serving Cell

DTX : Discontinuous Transmission mode of Serving Cell

MCC : Mobile Country Code of Serving Cell

MNC : Mobile Country Code of Serving Cell

LAC : Location Area Code of Serving Cell

CID : Cell ID of Serving Cell

BSIC : Base Tranceiver Station Identity Code of Serving Cell

TxPwrMax : MS\_TXPWR\_MAX\_CCH value of Serving Cell

RxMin : RXLEV\_ACCESS\_MIN value of Serving Cell

C2vld : C2\_VALID value of Serving Cell

CRoff : CELL\_RESELECT\_OFFSET value of Serving Cell

TMPoff : TEMPORARY\_OFFSET value of Serving Cell

PTime : PENALTY\_TIME value of Serving Cell

RF# : Number of frequencies in MA(Mobile Allocation)

T3212 : Periodic Location Update Timer

TxPwrLev : Current Tx power of MS

ACC : Access Control Class

Band : Current Band Information

TA : Current Timing Advance

Cipher : Cipher mode of Serving Cell

CBQ : Cell Bar Quality flag of Serving Cell

CBA : Cell Bar Access flag of Serving Cell

## 9. ENGINEERING MODE

---

### 9.4.3.2 Neighbour Cells

This menu displays the informations of Neighbour Cells.

ARFCN : Absolut Radio Frequency Channel Number (Frequency Number) of Neighbour Cell

RxLev : Rx Level of Neighbour Cell

C1 : C1 Value of Neighbour Cell, This value will be used to decide cell reselection.

C2 : C2 Value of Neighbour Cell, This value will be used to decide cell reselection.

MCC : Mobile Country Code of Neighbour Cell

MNC : Mobile Network Code of Neighbour Cell

LAC : Location Area Code of Neighbour Cell

CID : Cell ID of Neighbour Cell

BSIC : Base Tranceiver Station Identity Code of Neighbour Cell

### 9.4.3.3 Reset Information

This menu displays the information of reset point in source code, call stack.

### Call Timer

#### 9.4.4 Call Timer

This menu displays the time of all calls, including the received calls.

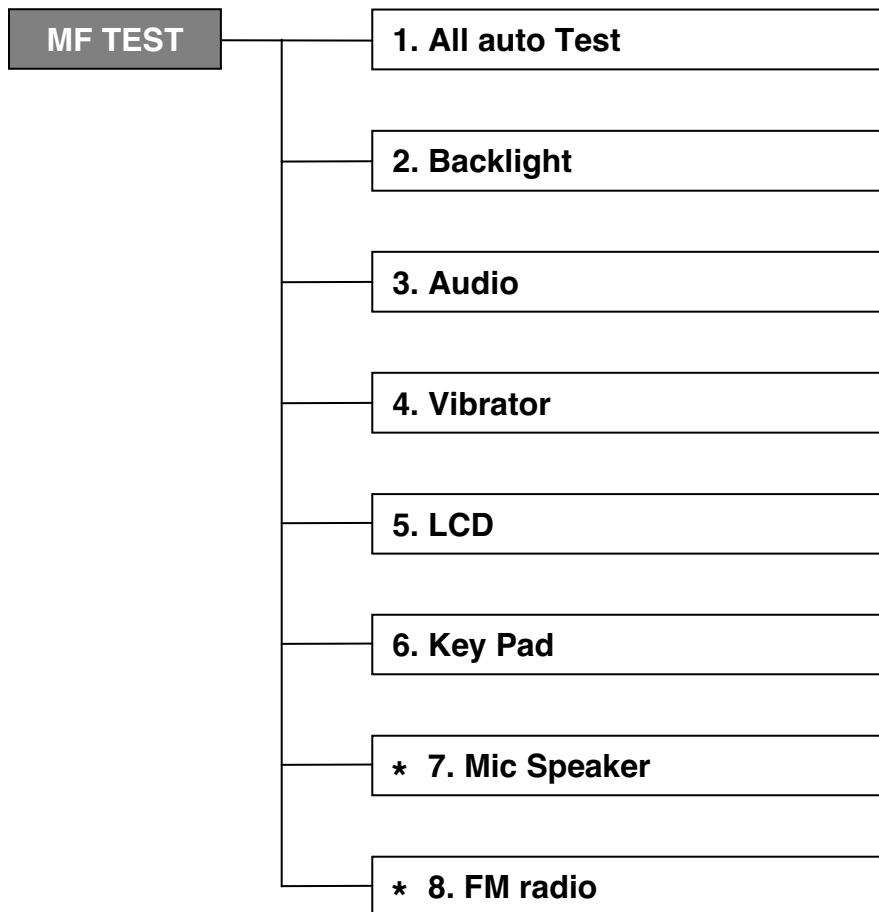
### Factory Reset

#### 9.4.5 Factory Reset

This menu is to format data block in the flash memory and this procedure set up the default value in data block.

## 9. ENGINEERING MODE

---



**\* function is not supported**

### 9.4.6 MF TEST

This manufacturing mode is designed to do the baseband test automatically.

Selecting this menu will process the test automatically, and phone displays the previous menu after completing the test.

#### 9.4.6.1 All auto Test

LCD, Backlight, Vibrator, Buzzer, Key Pad

#### 9.4.6.2 Backlight

LCD Backlight is on for about 1.5 seconds at the same time, then off.

#### 9.4.6.3 Audio

This menu is to test the volume of Melody. It rings in the following sequence.

Volume 1, Volume 2, Volume 3, Volume 0 (mute), Volume 4, Volume 5.

#### 9.4.6.4 Vibrator

Vibrator is on for about 1.5 seconds.

#### 9.4.6.5 LCD

Main LCD screen resolution tests horizontally and vertically one by one and fills the screen.

#### 9.4.6.6 Key Pad

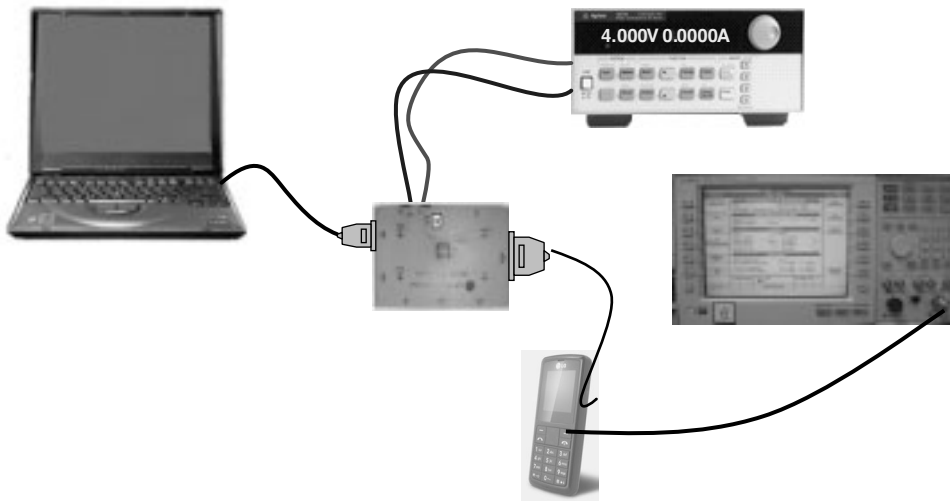
When a pop-up message shows 'Press Any Key', you may press any keys.

If the key is working properly, name of the key is displayed on the screen.

## 10. CALIBRATION

## 10. CALIBRATION

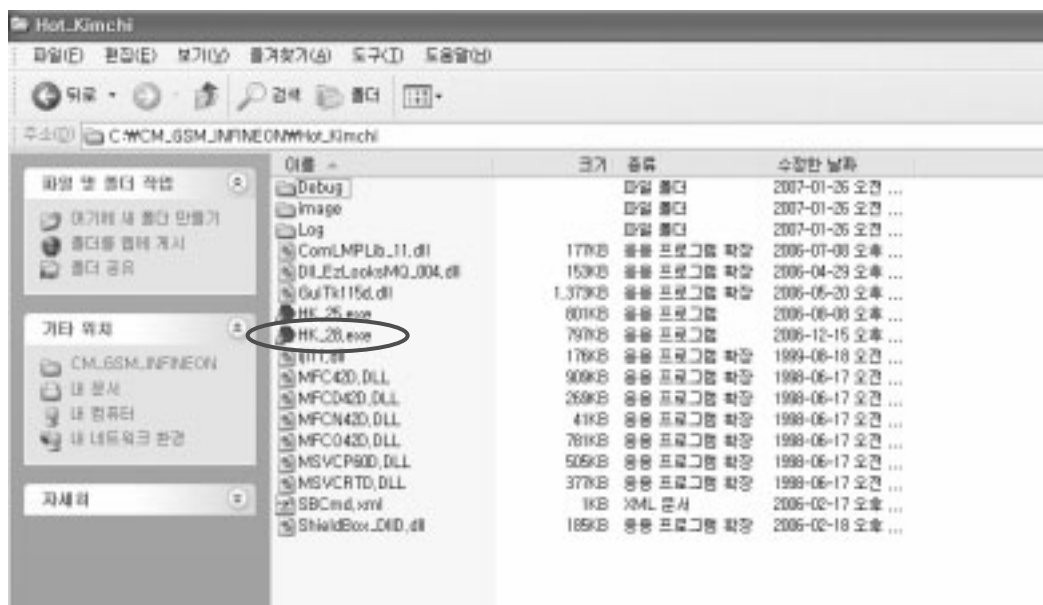
### 10.1 Test Equipment Setup



### 10.2 Calibration Steps

#### 10.2.1 Tune on the phone

#### 10.2.2 Execute "HK\_28.exe"



### 10.2.3 Click “SETTING” Menu



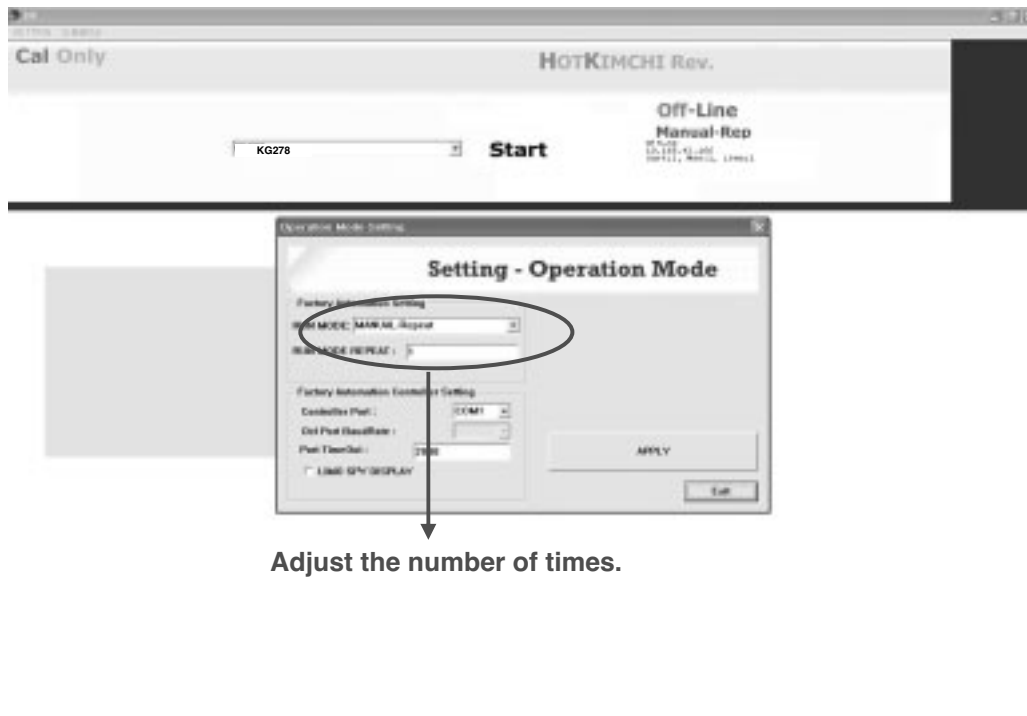
### 10.2.4 Setup “Ezlooks” menu such as the following figure



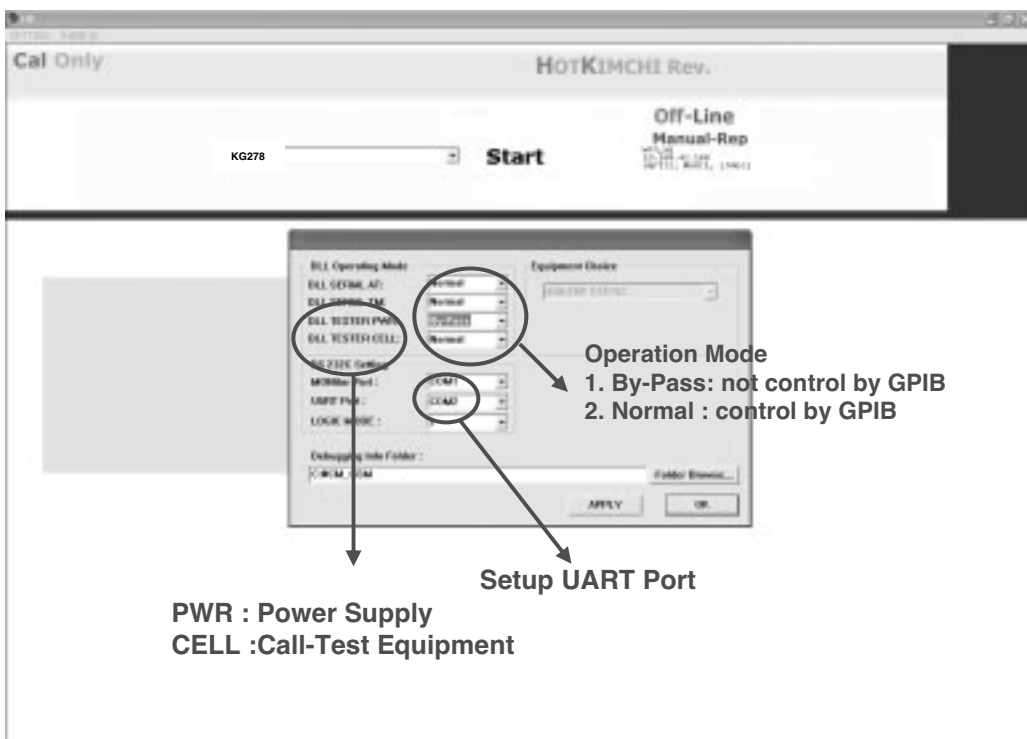


## 10. CALIBRATION

### 10.2.5 Setup "Line System" menu such as the following figure



### 10.2.6 Setup Logic operation such as the following figure



### 10.2.7 Select “MODEL”

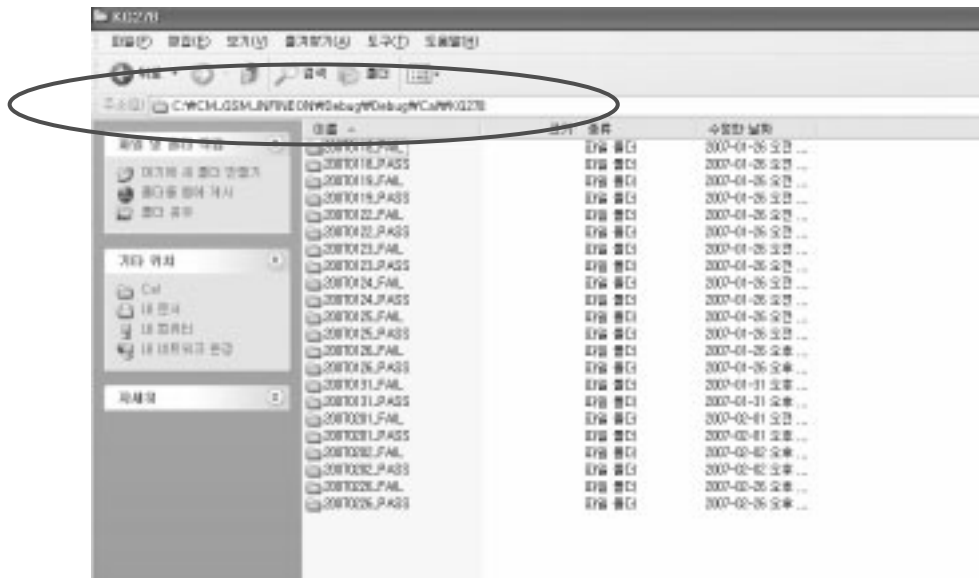
### 10.2.8 Click “START” for RF calibration



### 10.2.9 RF Calibration finish



### 10.2.10 Calibration data will be saved to the following folder



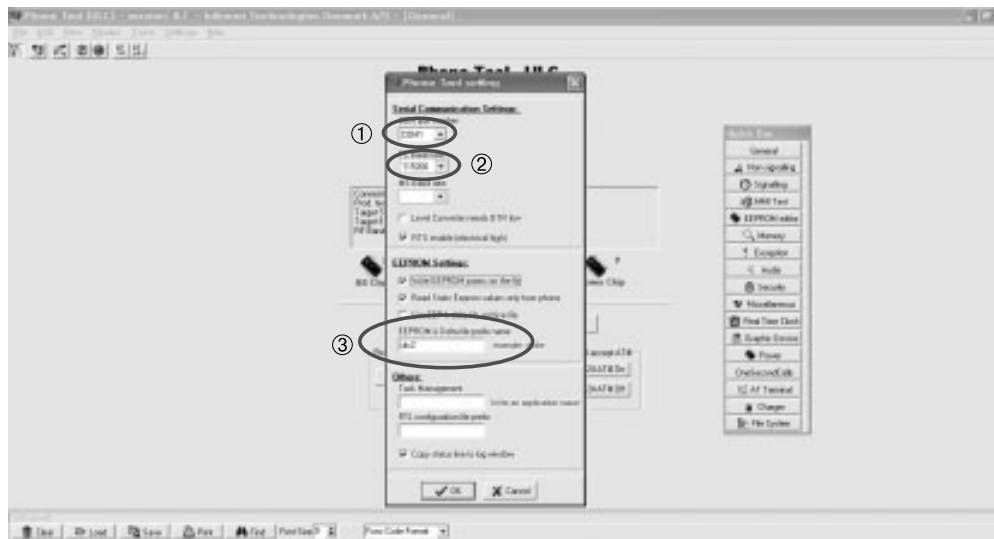
## 11. STAND ALONE TEST

## 11.1 Test Program Setting

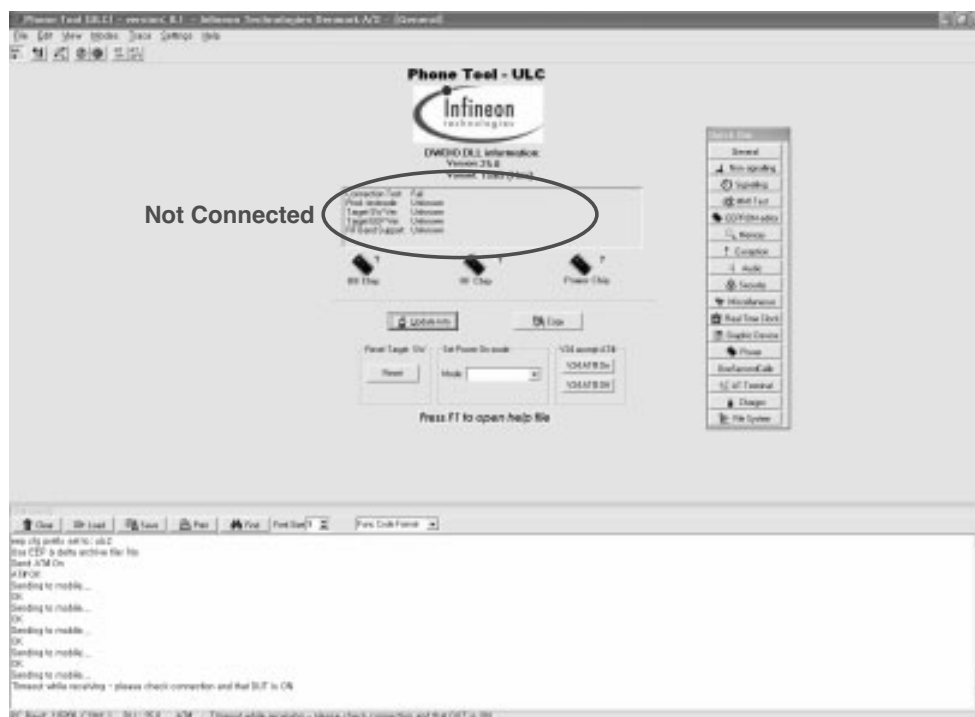
### 11.1.1 Set COM Port

### 11.1.2 Check PC Baud rate(115200)

### 11.1.3 Confirm EEPROM & Delta file prefix name



#### 11.1.4 Click “V24AT#ON” and then “Update Info” for communicating Phone and Test Program



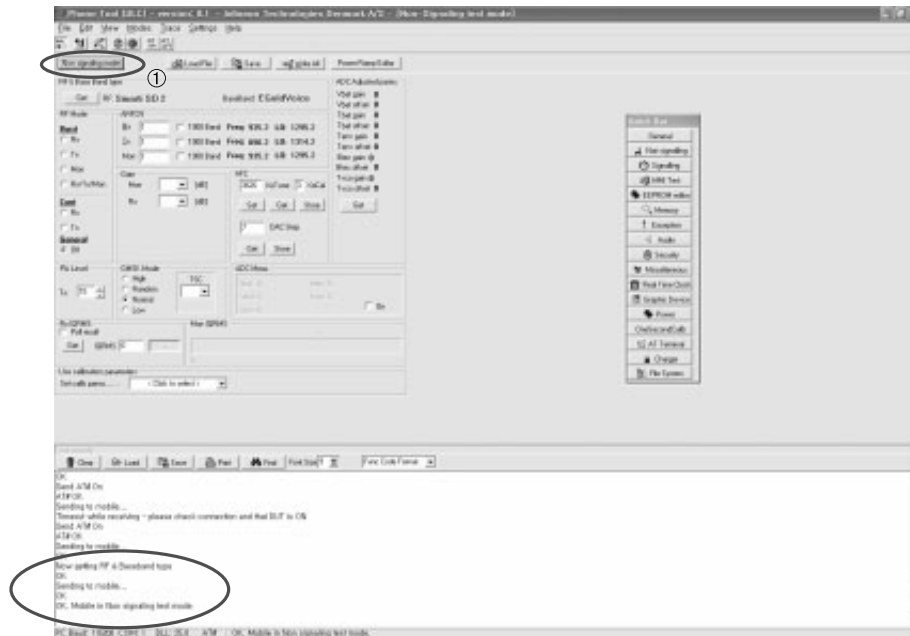


- 11.1.5 For the purpose of the Standalone Test, Change the Phone to “ptest mode” and then Click the “Reset” bar.
- 11.1.6 Select “Non signaling” in the Quick Bar menu. Then Standalone Test setup is finished.



## 11.2 Tx Test

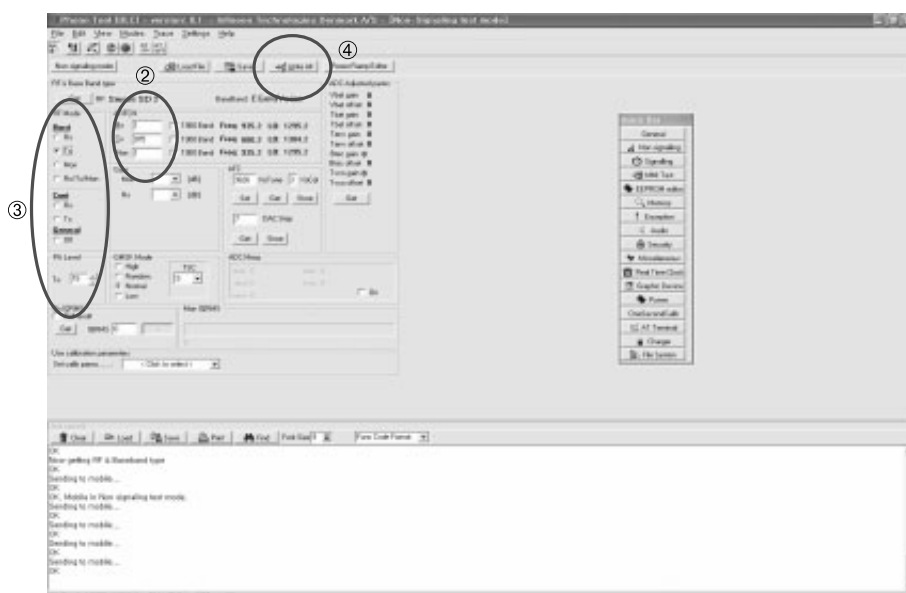
### 11.2.1 Click “Non signaling mode” bar and then confirm “OK” test in the command line



### 11.2.2 Put the number of TX Channel in the ARFCN

### 11.2.3 Select “TX” in the RF mode menu and “PCL” in the PA Level menu

#### 11.2.4 Finally, Click “Write All” bar and try the efficiency test of Phone



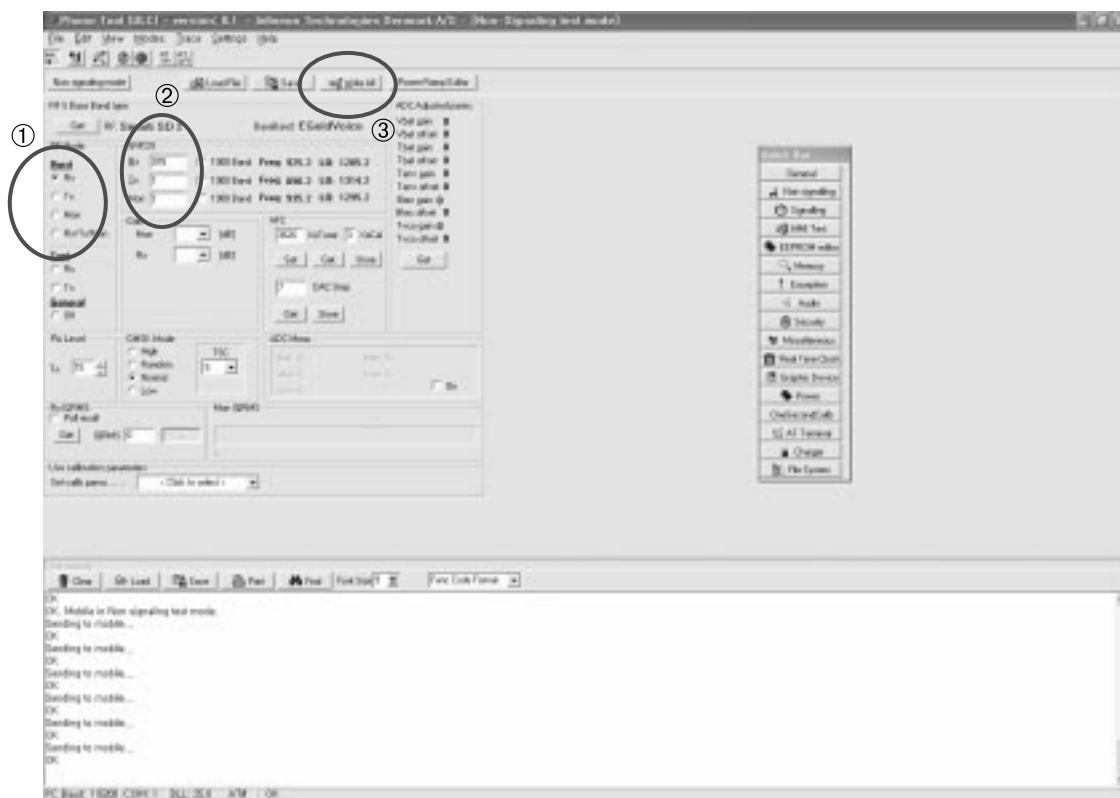
## 11. STAND ALONE TEST

### 11.3 RX Test

11.3.1 Put the number of RX Channel in the ARFCN

11.3.2 Select “RX” in the RF mode menu

11.3.3 Finally, Click “Write All” bar and try the efficiency test of Phone









## 12. EXPLODED VIEW & REPLACEMENT PART LIST

### 12.2 Replacement Parts <Mechanic component>

**Note:** This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Specification	Color	Remark
1		GSM,BAR/FILP	TGSM0052501		Black	
2	AAAY00	ADDITION	AAAY0203327		Black	
3	MCJA00	COVER,BATTERY	MCJA0040301	MOLD, PC LUPOY SC-1004A, , , , ,	Black	24
2	APEY00	PHONE	APEY0430001		Black	
3	ACGK00	COVER ASSY,FRONT	ACGK0090401		Black	
4	MCJK00	COVER,FRONT	MCJK0071601	COMPLEX, (empty), , , , ,	Without Color	4
4	MPBG00	PAD,LCD	MPBG0058101	COMPLEX, (empty), , , , ,	Without Color	8
4	MPBM00	PAD,RECEIVER	MPBM0016401	COMPLEX, (empty), , , , ,	Without Color	5
4	MTAB00	TAPE,PROTECTION	MTAB0168901	COMPLEX, (empty), , , , ,	Without Color	1
4	MTAD00	TAPE,WINDOW	MTAD0065701	COMPLEX, (empty), , , , ,	Without Color	3
4	MWAC00	WINDOW,LCD	MWAC0077002	CUTTING, PMMA MR 200, , , , ,	Black	2
4	SURY00	RECEIVER	SURY0013001	PIN ,109 dB,32 ohm,11*7 ,3T ,; , , , , ,CONTACT ,		6
3	ACGM00	COVER ASSY,REAR	ACGM0086801		Black	
4	ENZY00	CONNECTOR,ETC	ENZY0019901	3 PIN,3 mm,STRAIGHT , ,		15
4	MCCZ00	CAP	MCCZ0024001	MOLD, Urethane Rubber S185A, , , , ,	Black	19
4	MCJN00	COVER,REAR	MCJN0065001	MOLD, PC LUPOY SC-1004A, , , , ,	Black	20
4	MLAB00	LABEL,A/S	MLAB0000601	HUMIDITY STICKER	Without Color	
4	MPBN00	PAD,SPEAKER	MPBN0039901	COMPLEX, (empty), , , , ,	Without Color	17
3	GMEY00	SCREW MACHINE,BIND	GMEY0002001	1.4 mm,3 mm,MSWR3(BK) ,B ,+ ,HEAD t=0.6, HEAD d2.7		21
3	MBJA00	BUTTON,DIAL	MBJA0024302	KG271 PAKBK	Without Color	9
3	MCCF00	CAP,MOBILE SWITCH	MCCF0042301	MOLD, Urethane Rubber S185A, , , , ,	Black	22
3	MLAK00	LABEL,MODEL	MLAK0018605	PRINTING, (empty), , , , ,	Without Color	25
5	ADCA00	DOME ASSY,METAL	ADCA0063901		Without Color	10
5	SUMY00	MICROPHONE	SUMY0003802	FPCB ,-42 dB,4*1.5 ,		
5	MLAZ00	LABEL	MLAZ0038301	PID Label 4 Array	Without Color	

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

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Level	Location No.	Description	Part Number	Specification	Color	Remark
6	SC100	CAN,SHIELD	MCBA0016401	PRESS, NS, 0.2, , , ,	Without Color	13

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

### <Main component>

**Note:** This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Specification	Color	Remark
4	SJMY00	VIBRATOR,MOTOR	SJMY0007903	3 V,0.85 A,4*8 ,Height 5.8T Cylinder ;,3V , , ,11000 , , , ,		14
		VIBRATOR,MOTOR	SJMY0007904	3 V, 1 A,4*8 ,height 5.8mm ;,3V , , ,11000 , , , ,		
4	SNGF00	ANTENNA,GSM,FIXED	SNGF0022402	3.0 ,-2.0 dBd,, ,internal, GSM900/1800 ;,DUAL ,-2.0 ,50 ,3.0		18
4	SUSY00	SPEAKER	SUSY0025801	PIN ,8 ohm,89 dB,16 mm, ;, , , , , ,CONTACT		16
3	SAFY	PCB ASSY,MAIN	SAFY0193027			12
4	SAFB00	PCB ASSY,MAIN,INSERT	SAFB0061605			
5	SVLM00	LCD MODULE	SVLM0024402	MAIN ,128*128 ,35.78*39.7*2.7 ,65k ,CSTN ,TM ,S6B33BG ,1.52" Serial IF Only for CI		11
4	SAFF00	PCB ASSY,MAIN,SMT	SAFF0114327			
5	SAFC	PCB ASSY,MAIN,SMT BOTTOM	SAFC0086602			
6	BAT100	BATTERY,CELL,LITHIUM	SBCL0001901	3.3 V,0.025 mAh,COIN ,Capacitor type Backup Batt. Pb-Free ;,3.3 ,0.025mAh ,COIN		
6	C100	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C101	CAP,CERAMIC,CHIP	ECCH0005602	2.2 uF,16V ,K ,X5R ,HD ,1608 ,R/TP		
6	C104	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
6	C105	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
6	C106	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C107	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C108	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C109	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C110	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C111	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C112	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C113	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C114	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C115	CAP,CERAMIC,CHIP	ECCH0005602	2.2 uF,16V ,K ,X5R ,HD ,1608 ,R/TP		
6	C117	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C118	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C119	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C120	CAP,CERAMIC,CHIP	ECCH0002101	1 uF,10V ,K ,B ,TC ,2012 ,R/TP		
6	C121	CAP,CERAMIC,CHIP	ECCH0002004	0.22 uF,10V ,K ,B ,TC ,1005 ,R/TP		

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C122	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C123	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C124	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C125	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C126	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C127	CAP,CERAMIC,CHIP	ECCH0000157	15 nF,16V,K,X7R,HD,1005,R/TP		
6	C128	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C129	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C130	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
6	C131	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C132	CAP,CHIP,MAKER	ECZH0001106	4700 pF,25V ,K ,X7R ,HD ,1005 ,R/TP		
6	C133	CAP,CHIP,MAKER	ECZH0001106	4700 pF,25V ,K ,X7R ,HD ,1005 ,R/TP		
6	C200	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C201	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C202	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C203	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C204	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C209	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C210	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C211	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C212	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C221	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C222	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C223	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C302	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C303	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C304	CAP,CERAMIC,CHIP	ECCH0006501	10 uF,6.3V ,K ,X5R ,TC ,2012 ,R/TP		
6	C305	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C306	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C307	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C308	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C309	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C310	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C311	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C312	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C313	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C314	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C315	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C316	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C317	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C319	CAP,CERAMIC,CHIP	ECCH0006501	10 uF,6.3V ,K ,X5R ,TC ,2012 ,R/TP		
6	C320	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C321	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C322	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C323	CAP,CERAMIC,CHIP	ECCH0006501	10 uF,6.3V ,K ,X5R ,TC ,2012 ,R/TP		
6	C324	CAP,CERAMIC,CHIP	ECCH0006501	10 uF,6.3V ,K ,X5R ,TC ,2012 ,R/TP		
6	C325	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C326	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C327	CAP,CERAMIC,CHIP	ECCH0003002	10 uF,10V ,Z ,Y5V ,HD ,2012 ,R/TP		
6	C328	CAP,CHIP,MAKER	ECZH0000841	56 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C329	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C330	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C331	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C332	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C333	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C335	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C336	CAP,CERAMIC,CHIP	ECCH0000104	3 pF,50V,C,NP0,TC,1005,R/TP		
6	C337	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
6	C338	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C339	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C340	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C341	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C342	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C400	CAP,CHIP,MAKER	ECZH0000802	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C401	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C402	CAP,CERAMIC,CHIP	ECCH0003002	10 uF,10V ,Z ,Y5V ,HD ,2012 ,R/TP		
6	C403	CAP,CHIP,MAKER	ECZH0000816	12 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C404	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C405	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C406	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
6	C407	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C408	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C410	CAP,CERAMIC,CHIP	ECCH0009505	22 pF,25V ,J ,NP0 ,TC ,0603 ,R/TP		
6	C413	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C414	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C417	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C418	CAP,CHIP,MAKER	ECZH0000826	27 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C419	CAP,CERAMIC,CHIP	ECCH0000104	3 pF,50V,C,NP0,TC,1005,R/TP		
6	C420	CAP,CERAMIC,CHIP	ECCH0000104	3 pF,50V,C,NP0,TC,1005,R/TP		
6	C421	CAP,CERAMIC,CHIP	ECCH0000104	3 pF,50V,C,NP0,TC,1005,R/TP		
6	C422	CAP,CERAMIC,CHIP	ECCH0000104	3 pF,50V,C,NP0,TC,1005,R/TP		
6	CN200	CONNECTOR,FFC/FPC	ENQY0013801	13 PIN,0.3 mm,STRAIGHT , , , , ,0.30MM ,FPC ,STRAIGHT ,TOP ,SMD ,R/TP ,[empty] ,		
6	CN301	CONNECTOR,I/O	ENRY0006401	18 PIN,0.4 mm,ANGLE , ,H=2.5, Reverse Type		
6	D300	DIODE,SWITCHING	EDSY0005301	SC-70 ,80 V,0.1 A,R/TP ,		
6	FB300	FILTER,BEAD,CHIP	SFBH0008105	1800 ohm,1005 ,Chip bead , , ,1800ohm , , ,[empty] ,R/TP		
6	FB301	FILTER,BEAD,CHIP	SFBH0008105	1800 ohm,1005 ,Chip bead , , ,1800ohm , , ,[empty] ,R/TP		
6	FB302	FILTER,BEAD,CHIP	SFBH0008105	1800 ohm,1005 ,Chip bead , , ,1800ohm , , ,[empty] ,R/TP		
6	FL400	FILTER,SEPERATOR	SFAY0010101	850.1900 ,900.1800 ,2.0 dB,2.0 dB,2.0 dB,2.0 dB,ETC ,Dual Band ASM, 2.5x2.5x1.2		
6	FL401	FILTER,SAW,DUAL	SFSB0001401	942.5 MHz,35 MHz,2.1 dB,20 dB,1842.5 MHz,75 MHz,2.3 dB,12 dB,2.0*1.6*0.68 ,SMD ,925M~960M,1805M~1880M,10p.B,150_82,150_15,EGSM +DCS Rx , , ,942.5 ,1842.5 ,2.0*1.6*0.68 ,SMD ,R/TP		
6	J300	CONN,SOCKET	ENSY0018101	6 PIN,ETC , ,2.54 mm,H=1.5		
6	L102	INDUCTOR,CHIP	ELCH0001032	18 nH,J ,1005 ,R/TP ,PBFREE		
6	L103	INDUCTOR,CHIP	ELCH0004715	27 nH,J ,1005 ,R/TP ,		
6	L104	INDUCTOR,CHIP	ELCH0004715	27 nH,J ,1005 ,R/TP ,		
6	L300	INDUCTOR,CHIP	ELCH0001556	270 nH,J ,1608 ,R/TP ,		
6	L400	INDUCTOR,CHIP	ELCH0004721	2.2 nH,S ,1005 ,R/TP ,		
6	L401	INDUCTOR,CHIP	ELCH0001413	22 nH,J ,1005 ,R/TP ,PBFREE		
6	L403	INDUCTOR,CHIP	ELCH0001032	18 nH,J ,1005 ,R/TP ,PBFREE		
6	L404	INDUCTOR,CHIP	ELCH0003814	5.1 nH,S ,1005 ,R/TP ,5.1nH,1005		
6	Q200	TR,BJT,NPN	EQBN0007101	EMT3 ,0.15 W,R/TP ,LOW FREQUENCY		
6	Q300	TR,BJT,NPN	EQBN0007101	EMT3 ,0.15 W,R/TP ,LOW FREQUENCY		

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	R100	RES,CHIP,MAKER	ERHZ0000506	6800 ohm,1/16W ,J ,1005 ,R/TP		
6	R101	RES,CHIP,MAKER	ERHZ0000244	22 Kohm,1/16W ,F ,1005 ,R/TP		
6	R102	RES,CHIP	ERHY0000278	82K ohm,1/16W,J,1005,R/TP		
6	R104	RES,CHIP,MAKER	ERHZ0000438	20 Kohm,1/16W ,J ,1005 ,R/TP		
6	R105	RES,CHIP,MAKER	ERHZ0000438	20 Kohm,1/16W ,J ,1005 ,R/TP		
6	R106	RES,CHIP,MAKER	ERHZ0000438	20 Kohm,1/16W ,J ,1005 ,R/TP		
6	R108	RES,CHIP	ERHY0000278	82K ohm,1/16W,J,1005,R/TP		
6	R109	RES,CHIP,MAKER	ERHZ0000507	68 Kohm,1/16W ,J ,1005 ,R/TP		
6	R110	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R111	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R112	RES,CHIP,MAKER	ERHZ0000287	47 Kohm,1/16W ,F ,1005 ,R/TP		
6	R115	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R116	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R119	RES,CHIP	ERHY0003401	1800 ohm,1/16W ,J ,1005 ,R/TP		
6	R122	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R124	RES,CHIP	ERHY0008402	160 Kohm,1/16W ,F ,1005 ,R/TP		
6	R125	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R197	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R202	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R205	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R206	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R207	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R208	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R210	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R222	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R223	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R300	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R301	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R302	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R303	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R304	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R305	RES,CHIP,MAKER	ERHZ0000702	10 ohm,1/10W ,J ,1608 ,R/TP		
6	R306	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R307	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		



## 12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	R308	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R309	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R310	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R312	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R313	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R314	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R316	RES,CHIP,MAKER	ERHZ0000529	1.5 Kohm,1/16W ,J ,1005 ,R/TP		
6	R317	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R318	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R319	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R320	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R321	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R323	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R324	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R326	RES,CHIP,MAKER	ERHZ0000476	39 Kohm,1/16W ,J ,1005 ,R/TP		
6	R327	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R328	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R329	RES,CHIP,MAKER	ERHZ0000438	20 Kohm,1/16W ,J ,1005 ,R/TP		
6	R330	RES,CHIP,MAKER	ERHZ0000438	20 Kohm,1/16W ,J ,1005 ,R/TP		
6	R331	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R332	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R333	RES,CHIP,MAKER	ERHZ0000476	39 Kohm,1/16W ,J ,1005 ,R/TP		
6	R334	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R335	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R336	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R337	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R338	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R339	RES,CHIP,MAKER	ERHZ0000454	27 Kohm,1/16W ,J ,1005 ,R/TP		
6	R341	RES,CHIP,MAKER	ERHZ0000467	330 Kohm,1/16W ,J ,1005 ,R/TP		
6	R343	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R344	RES,CHIP,MAKER	ERHZ0000450	240 Kohm,1/16W ,J ,1005 ,R/TP		
6	R345	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R401	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R402	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	R403	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R404	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R405	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R406	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R407	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R410	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	SW400	CONN,RF SWITCH	ENWY0004501	,SMD , dB,H=3.6, Straight type		
6	U100	IC	EUSY0176402	Flip-Chip CSP ,9 PIN,R/TP ,Audio Power Amplifier		
6	U101	IC	EUSY0328601	DFN ,10 PIN,R/TP ,Li-ion charger IC, 1A, 10Pin, 3x3, DFN		
6	U102	IC	EUSY0317401	BGA ,189 PIN,R/TP ,E-Gold voice		
6	U200	IC	EUSY0238702	TSOPJW-12 ,12 PIN,R/TP ,3PORT Charge Pump(AAT2154 Low cost version)		
6	U301	IC	EUSY0328001	BGA ,56 PIN,R/TP ,32Mb/4Mb , 200 nm, MirroBit		
6	U302	IC	EUSY0320801	QFN ,20 PIN,R/TP ,FM Tuner Chip, 3*3*0.57, Pb Free		
6	U303	IC	EUSY0142501	LLP ,8 PIN,R/TP ,Dual 105mW Headphone Amplifier		
6	U304	IC	EUSY0223002	HVSO5 ,5 PIN,R/TP ,150mA CMOS LDO WITH OUTPUT CONTROL / 2.8V		
6	U305	IC	EUSY0300101	WQFN ,10 PIN,R/TP ,Small package Dual SPDT analog Switch, PB-Free		
6	U400	PAM	SMPY0014001	35.5 dBm,56 % , A, dBc, dB,6x6x1.15 ,SMD ,Tri Band		
6	X100	X-TAL	EXXY0004602	.032768 MHz,20 PPM,12.5 pF,65000 ohm,SMD ,6.9*1.4*1.3 ,		
6	X101	X-TAL	EXXY0018404	26 MHz,10 PPM,8 pF,40 ohm,SMD ,3.2*2.5*0.6 ,12ppm at -30°C ~ +85°C, C0 1.0pF, C1 3.6fF ,; ,26 ,10PPM ,8 , ,SMD ,R/TP		
5	SAFD	PCB ASSY,MAIN,SMT TOP	SAFD0085602			
6	C102	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C103	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	L100	INDUCTOR,CHIP	ELCH0004711	22 nH,J ,1005 ,R/TP ,		
6	L101	INDUCTOR,CHIP	ELCH0004711	22 nH,J ,1005 ,R/TP ,		
6	LD200	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD201	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD202	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD203	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD204	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD205	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	R201	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	R203	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R204	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R209	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R211	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R212	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R213	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R214	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R215	RES,CHIP,MAKER	ERHZ0000505	680 ohm,1/16W ,J ,1005 ,R/TP		
6	R216	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R217	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R218	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R219	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R220	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R221	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	SPFY00	PCB,MAIN	SPFY0144601	FR-4 ,.0.8mm,BUILD-UP 4 ,KG270/KG278 Main PCB ,; , , , , , , , , ,		

## 12. EXPLODED VIEW & REPLACEMENT PART LIST

### 12.3 Accessory

**Note:** This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Specification	Color	Remark
3	SBPL00	BATTERY PACK,LI-ION	SBPL0089503	3.7 V,750 mAh,1 CELL,PRISMATIC ,WLT, BATT, Europe Label, Pb-Free ,; ,3.7 ,750 ,0.2C ,PRISMATIC ,43x34x46 , ,ALLTEL SILVER ,Innerpack ,Europe Label		23
		BATTERY PACK,LI-ION	SBPL0088203	3.7 V,750 mAh,1 CELL,PRISMATIC ,GB3 BATT(CMW standard batt), Europe, Pb-Free ,; ,3.7 ,750 ,0.2C ,PRISMATIC ,43x34x46 , ,ALLTEL SILVER ,Innerpack ,Europe Label		23
3	SGEY00	EAR PHONE/EAR MIKE SET	SGEY0003209	; ,10mW ,16 OHM ,105dB ,10KHZ ,450HZ ,[empty] ,BLACK,EARPHONE HOUSING:SILVER ,18P MMI CONNECTOR ,MONO18P(5P)LOW COST		
3	SSAD00	ADAPTOR,AC-DC	SSAD0024901	100-240V ,5060 Hz,5.1 V,,7 A,CB/GOST ,AC-DC ADAPTOR ,; ,100Vac~350Vac ,5.1V (+0.15, -0.2) ,700mA ,5060 , ,WALL 2P ,I/O CONNECTOR ,		
		ADAPTOR,AC-DC	SSAD0024902	100-240V ,5060 Hz,5.1 V,,7 A,CB/GOST ,AC-DC ADAPTOR ,; ,100Vac~350Vac ,5.1V (+0.15,-0.2) ,700mA ,5060 , ,WALL 2P ,I/O CONNECTOR ,		

## Note

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